PSYCHOLOGY

GENERAL
INDUSTRIAL
SOCIAL

By
John Munro Fraser, M.A.

PITMAN

THIS book was written to provide an introduction to general psychology, and to show how to apply it to the problems of industry and commerce and the management of social groups. In this endeavour the author, an acknowledged authority on human relations in industry, has drawn on the experience acquired during his years with the National Institute of Industrial Psychology, and how far he has succeeded may be judged by the inclusion of the first edition in a list of "The One Hundred Best Books on Management Subjects" compiled recently by a panel of experts.

In this second edition the author describes a new method of assessing the qualities of an individual in the relations to the demands of a job. It is an approach that has been found to have certain advantages over earlier techniques. Apart from this, although the text has been thoroughly revised, the tructure of the book remains unaltered.

Mr. Fraser's book should now prove even more useful in illuminating the problems which surround the managing of men.

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PSYCHOLOGY
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PSYCHOLOGY

GENERAL—INDUSTRIAL—SOCIAL

BY

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TO
IRENE MUNRO FRASER, M.A.

PREFACE TO SECOND EDITION

It is now some years since this book first appeared, and its persistent popularity with the students for whom it was written has encouraged me to prepare a second edition. The most important textual change is the introduction of a different method of setting out the personal qualities of an individual for purposes of vocational selection or placement. This has been outlined in an additional chapter (Chapter XIII), and has been found—in the actual teaching of students during the last few years—to have certain advantages over earlier techniques. Although emendations have been made throughout the text, the book remains unaltered in structure. I hope it will continue to be useful to those who are seeking an introduction to the subject within a limited compass.

JOHN MUNRO FRASER

October, 1962

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PREFACE TO FIRST EDITION

In 1947 the Committee on Education for Management recommended that psychology be included in the syllabus for a Common Intermediate Examination as a "background" subject. Its report sets out the reasons in the following terms, the aim being "to give students some training in the art and science of handling men," while the method is outlined in the succeeding sentence: "The content of the course is designed to provide an introduction to general psychology and to illustrate its application in dealing with the human problems of industry and commerce and the management of social groups."

It is with these terms of reference in mind that this book has been written. It is an endeavour to survey the fields of general, industrial, and social psychology from the manager's point of view and to draw the main issues together within reasonable space. Detail has been disregarded in order to present a coherent theme, and there will inevitably be passages where I have done less than justice to the complexities of the subject. The student who wishes to follow up any aspect in greater detail will find some guidance in the Notes on Reading on p. 331.

The views I have put forward were acquired during the years I spent on the scientific staff of the National Institute of Industrial Psychology. They do not in any way constitute an official pronouncement by that body. I am glad, however, to acknowledge my debt to colleagues past and present, while reserving to myself the responsibility for any deficiencies in presentation.

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PART I—GENERAL PSYCHOLOGY

CHAPTER I

FROM CLASSICAL THOUGHT TO THE SCIENTIFIC METHOD

How many angels can dance together on the point of a needle?

This is a question which is said to have occupied the minds of scholars in the middle ages. In actual fact it is very doubtful if many of them ever really spent much time on it, but whether they did or not, it provides a useful illustration of how men thought five hundred years or more ago.

The reasoning used to answer this question was as follows—

1. An angel, as an incorporeal being, has neither limbs nor body and consequently takes up no room in space.

2. Nevertheless angels can occupy a position in space, for we think of them as being present in a particular place at any one time.

3. It follows, therefore, that an angel could be present on the point of a needle. But as he would take up no room there, there would be nothing to prevent him from being joined by another angel. Both being incorporeal, the two together would take up no more room than the first one alone.

4. In the same way, these two could be joined by a third, a fourth, a fifth and many more, until an infinite number had congregated.

Millions of angels, therefore, could dance together on the point of a needle without any danger of jostling or getting in each other's way, and if you follow the four steps in the reasoning carefully you will be bound to admit that this has the appearance of being a logical, though perhaps not a practically useful, conclusion.

THE DEDUCTIVE METHOD

This is an example of *deduction* or reasoning from general principles to a particular conclusion. As we have seen, it starts off with two principles which were held to be self-evident, or acceptable to anyone without any need for further discussion or proof. They were—

1. That angels, having no solid bodies, take up no room in space.

2. That angels can nevertheless be located in space.

If these are accepted as true—and in those days when people were more inclined to accept the idea of angels than we perhaps are today, there was thought to be little need to examine them further—then the somewhat surprising conclusion that millions could dance on the point of a needle follows naturally and inevitably.

Up till about four hundred years ago most formal reasoning followed the deductive method. This is not to say that scholars were exclusively preoccupied with flippancies like these, but nevertheless it did result in our knowledge of the world about us being sadly imprecise and unsystematic. The ancient philosophers had built up a theory of the universe with the Earth at the centre and a series of concentric spheres carrying the various stars and planets grouped around it. The other "elements," Water, Air, and Fire, had their appropriate places in the scheme to which they were supposed to have a natural tendency to return. Ingenious and plausible as these theories undoubtedly were, they had little basis in exact observation. With the sweeping away of classical civilization by the Barbarian invasions the advance of knowledge slowed down; these theories were all that were left to explain the natural world, and they came to be accepted without further scrutiny. Conclusions were drawn from them which have only the most superficial relationship to the actual facts of experience.

For example, the four "elements" which were thought to underlie all matter, Earth, Air, Fire, and Water, were held each to have its characteristic "humour." Men's temperaments were thus supposed to be governed by the proportions of the different elements in their bodies. If a man had too much of the fiery element in his body, his temperament would be affected by the hot, dry humours which characterized it. He would be liable, in consequence, to fits of anger or irritation and thus would be known as a "choleric" man. Similarly with someone who had too much of the earthy element: he would suffer from the dull and heavy humours which characterized it, and would be "phlegmatic" in temperament.

No one had ever identified actual fire or earth in anyone's body, though they found substances which they believed partook of their nature. This did not prevent them from drawing such loose, though superficially plausible generalizations and treating them as explanations of everyday occurrences. Being based on unsound original principles, they were usually unsatisfactory and often misleading, though many hold sway in popular thought today.

THE DECISIVE STEP

There was little chance of any real progress in our understanding of the natural world so long as these methods of thought dominated men's minds. In the sixteenth and seventeenth centuries, however, changes began to take place and new observations began to show that many of the older theories did not account satisfactorily for what was actually happening. The astronomers gained more knowledge of the movements of the planets, the physicians of what went on inside the body, others studied the qualities of various substances, while some began to deal with magnetic attraction. Developments in mathematics made it possible to see new relationships between these data and for a time it was obvious that the old theories were quite inadequate although no one had produced anything which was capable of taking their place.

It was at this time that an Englishman, Francis Bacon, Lord Keeper to Queen Elizabeth, pointed out the unsatisfactoriness of the existing state of knowledge. Most of what was accepted as self-evident, he said, had never been verified by observation of what actually takes place in nature. The so-called general principles were thoroughly unreliable, but nevertheless they had been exalted into a system of original causes which purported to underlie everything that happened in the world of nature. Most of the reasoning from these "first principles" was bound to lead to thoroughly unsatisfactory conclusions.

Now as most reasoning up till then had followed the deductive method there was little hope of progress. In this method everything depends on the principles from which we start and as these were unsound, because they were not based on exact observation, the conclusions were bound to be faulty. There is very little science, or natural knowledge, worthy of the name before the beginning of the seventeenth century.

Bacon's remedy for this unsatisfactory state of affairs was a quite simple reversal of the process. Instead of starting with general principles, he wanted to start with the facts—facts gathered from observation of a number of cases of the subject under review. Once enough cases had been studied, Bacon held, the similarities and regularities observed among them would quickly lead to the principles by which they were governed. This is known as the *Inductive method*, which starts with particular instances and works from them to the general principles.

SCIENCE AND THE INDUCTIVE METHOD

Probably the first great natural scientist was Sir Isaac Newton, whose work illustrates the effectiveness of Bacon's method. Among other things, he collected many of the observations which had been made about the movements of heavenly bodies—facts gained by observation, as Bacon had said. The fall of the apple suggested to him that the earth was exerting a pull on smaller bodies around it, and this gave him the clue to the principle of gravitation which explained how the planets were held in their courses by the pull they exerted on each other. Applying this principle, he worked out the position of the stars and planets mathematically and decided where each should be in relation to the others. When he compared his conclusions with his observation of the actual positions, he found that each was in its right place and that therefore his theory fitted the facts.

From Newton onwards the scope of natural knowledge has been constantly extended. Physics, chemistry, astronomy, biology, and many other fields have yielded up their secrets when subjected to systematic study by the scientific method. It is unnecessary to follow the development of science in detail, or to call attention to the mass of scientific knowledge now available which touches our daily lives at so many points, but a word may be said about the method.

Briefly, the scientific method falls into three stages—

First, as Bacon said, comes the systematic observation of what actually happens. Data must be assembled which must be exact and which should whenever possible be in the form of measurements, for only in such quantitative form can they be easily classified and their regularities studied. It was Lord Kelvin who said "Science begins with measurement."

Secondly comes the search for an explanation which will fit the facts. Several of these possible explanations, or *hypotheses*, may be tried, until one has been found which seems to account for everything accurately and comprehensively.

Thirdly comes the decisive stage of establishing whether this hypothesis is the correct one. This is done by *experiment*, or the devising of crucial situations in which the predictive value of the hypothesis can be tested. If it fits all the facts, the result of the experiment will be what would be expected according to that hypothesis. If it does not fit all the facts the result will be unexpected and another hypothesis must be found.

HUMAN BEHAVIOUR

From the beginning of recorded history men have been interested in themselves, in human motivation, in the differences between individuals and in anything else which concerns human behaviour. Classical literature is full of speculations about why people do certain things, and a number of explanations and descriptions of certain areas of human behaviour are put forward.

Occasionally these are interesting and illuminating but in most cases they suffer from the defects we have referred to above. Lacking any adequate basis of observation they are usually no more than generalizations with some superficial plausibility but little real value as explanations of human conduct. The search continued, however, and each century has its quota of treatises about human behaviour, for it was felt that some understanding of the principles by which man's actions were governed would be of great practical as well as theoretical value.

We may note two trends, therefore. On the one hand, there is a continuing interest in human behaviour and a desire to find the underlying principles which would explain it.

On the other, there is the development of the scientific method which had so greatly increased our knowledge of the natural world during the last three hundred years or so. Sooner or later someone was going to take this method, which had proved so useful in other fields, and apply it to those problems which had proved so interesting and yet so baffling for so long.

THE BEGINNINGS OF EXPERIMENTAL PSYCHOLOGY

It was in the latter part of last century that this development took place. First in Germany, then in other countries, laboratories were opened for the systematic study of human behaviour and data began to be collected about certain aspects of it. The questions mapped out for study were much more modest than those which had hitherto occupied the minds of scholars, but they were at least matters which could be observed carefully and systematically, and the results of these observations could be subjected to proper classification and analysis.

Gradually a body of knowledge began to be built up. It was concerned with undramatic matters like learning and remembering, with how we see and hear, and so on. There were many gaps—indeed there still are gaps—in the understanding of human behaviour, and there were many problems which did not seem to yield easily to scientific study. The great difference, however, was that the new knowledge was verifiable, that is to say, anyone who cared could repeat the experiments for himself and would reach the same conclusions. Experimental psychology might be a late arrival among the sciences, but a science it remained none the less, for its conclusions were no longer the mere speculations of inspired individuals. They had been reached by the established processes of observation, hypothesis, and experiment, and though the principles so far uncovered might be relatively few, they could rank with the results of the older sciences as items of established, verifiable knowledge.

There are, however, difficulties, most of which arise from one or other of two sources. The first concerns measurement, to which reference has already been made. While the physical scientists could begin with the standard units already in existence for the measurement of dimensions, weight and so on, the early experimental psychologists enjoyed no such advantage. They had frequently to devise their own units of measurement for the phenomena they were observing and this in many cases proved a difficult task. The essential point about a unit of measurement is that it shall be objective and capable of giving the same results when used by a number of different individuals in a series of different observations. In observing human behaviour, however, it is not unknown for two individuals to record quite different happenings on the same occasion. Moreover, the behaviour itself can change as soon as it is subjected to systematic observation. The collecting of objective data about human behaviour, therefore, presents serious problems.

The second set of difficulties concerns the establishment of hypotheses by experiment. In the physical sciences it has proved possible, with the necessary ingenuity, to devise crucial situations which will prove whether or not a suggested explanation can be relied upon. But when studying human behaviour, this is not so easy. In an experiment it is normally essential that all the factors in the situation should be brought under exact control and only one allowed to vary at a time. In studying human beings, however, while some of the variables can be kept under control, can we be sure that all the people being studied are trying equally hard, that they are taking the situation equally seriously, that they each attach the same importance to every factor? This is by no means certain and there is, in consequence, a reservation in the minds of some people about the results of such experiments. Situations set up artificially in a laboratory are not real life, and the hypotheses established by these means are not always accepted universally as explaining human behaviour in the workaday world of ordinary life.

THE SOURCES OF EXPERIENCE

All our knowledge of the outside world must come to us in the first place through our *senses*. In the early stages of psychological study, therefore, some time was spent in investigating how the senses work and how they convey their information to the brain. Some account of this is given in Chapter II. But it soon became obvious that only a few of the manifold happenings which pass before our eyes, ears and other sense-organs really make any impression on us. The phenomenon of *attention*, therefore, also called for investigation. Even those sensations to which we pay attention, however, have to be put together and fitted into the general pattern of our experience before they have much meaning, and consequently the transformation of sensations into *perceptions* had also to be studied. Sometimes, of course, we can attach the wrong meaning to what we see or hear because we have been influenced by a misleading *suggestion*. Attention, perception, and suggestion, then, form the subject-matter of Chapter III.

When the variations between human and animal behaviour came to be studied, it was soon apparent that one of the main differences between the two was that human beings had a much greater power of trying things out "in their heads." This links up with the study of *imagery* or calling up the impressions of sensations without our sense-organs actually being stimulated. When the traces of experiences we have had in the past are gone over again in this way we have the phenomenon of *memory*. Again when we try out our memories of what has happened in the past and our images of what might happen in the future in different combinations we are, in fact, *thinking*. Imagery, memory, and thinking are dealt with in Chapter IV.

Another difference between man and various animals is his much greater range and speed of *learning*. This was subjected to a great deal of systematic study and an outline of the various methods of learning and the conditions which govern it is given in Chapter V.

Nothing so far has been said about why an individual might want to learn one thing rather than another, or about the drives that *motivate* him. There has been some controversy about the instincts or urges which lie at the basis of all behaviour, and along with the feelings or *emotions* which follow the achievement or non-achievement of our goals, these have proved among the most difficult points to clarify. Some measure of agreement, however, has now been reached and these subjects are dealt with in Chapter VI.

All the foregoing matters concern the normal person, and *general psychology* and its methods of study are concerned in the first place with normal behaviour. There is, however, a minority of abnormal persons who either through congenital defect or mental illness do not behave like others. The study and treatment of abnormal behaviour forms the subject-matter of *psychiatry* and a few details of this are given in Chapter VII.

It is not suggested that the studies of psychologists followed this chronological order. Many of these subjects were being studied at the same time in different parts of the world, and at present research is being carried on in one place or another on all of them. Such a sequence, however, provides a reasonably logical order in which to arrange our knowledge of the individual, the sources of his experience, his methods of arranging and comprehending it, and his motivation and feelings. It will accordingly be followed in the first section of this book.

SUMMARY

1. What are the two principal methods of reasoning?

First there is the deductive method by which we start from generally accepted principles and reach particular conclusions, and second there is the inductive method by which we start with particular observations and work out the general principles which would account for them. Though science appears to rely mainly on the inductive reasoning, both methods are essential to constructive thought.

2. What are the essential steps in the scientific method?

First, the collection of factual data, their classification and analysis.

Second, the propounding of a hypothesis or possible explanation.

Third, the verification of that hypothesis by checking it against further data, usually in the form of an experiment.

3. How did experimental psychology come to appear as a science?

When the scientific method came to be applied to the study of human behaviour in the latter part of the nineteenth century. Only then did conclusions come to be reached which could be verified by repeating the observations and experiments.

4. Are there any difficulties in the application of the scientific method to the study of human behaviour?

One set of difficulties is concerned with measurement, for there are few standard units which can be readily applied in experimental psychology and it is not always easy to devise new methods of measurement which are objective. The other set arises from the difficulty of devising experimental situations which can be controlled so as to test hypotheses, and at the same time are adequate representations of real life.

CHAPTER II

THE SENSES

THE individual person lives in a world which is occupied also by other human beings, animals, vegetable growths, and numerous material objects. He must, therefore, have some means of knowing what is going on around him if he is to keep out of the way of what is harmful and find his path safely among the other inhabitants of his living-space. Without some means of keeping in touch with his environment he would be an easy victim for those animals which are quicker and stronger than himself or even for such obvious dangers as falling off high places and breaking his bones.

Knowledge of the happenings in the outside world reaches us through our senses. The senses of sight, of hearing, of smell, and so on, enable us to receive news of certain kinds of happening and thus to keep in touch with what is going on around us. If we were to be deprived of any one of these senses we should have to live under a very grave handicap for we should lose one of our means of contact with the outside world. If we were to be deprived of all our senses we should indeed be in a sorry state.

The study of human individuals, then, might well begin with a survey of the kinds of impression they are capable of receiving from the environment in which they live. Most of this chapter, therefore, will be devoted to a description of the principal sense-organs and their workings.

THE SENSE OF SIGHT

First, and in many ways most important, is the means whereby we receive impressions of the shape of things around us, their distance from us, their colour and the texture of their surfaces. These impressions come through our eyes which are like two cameras, each with lens, diaphragm and shutter, throwing images of the objects before them on to a sensitive plate behind.

In a camera the rays of light reflected by an object are concentrated by the lens and an image is projected on to the film or plate at the back. Should the light be too bright it can be modified by narrowing the aperture in front of the lens by means of a movable diaphragm.

Many of the parts in the human eye are much the same as in a camera. The lens catches the rays of light reflected by an object and concentrates them as in a camera, the only difference being that in the human eye the lens can alter its curvature so as to focus on objects at different distances away. The place of the diaphragm in a camera is taken by the iris in the eye: this is the ring of grey, blue, or brown which surrounds the pupil, or black opening through which the light reaches the lens. When the light is dull and it becomes difficult to see, the iris shrinks to a narrow rim and the pupil becomes large so as to admit as much light as possible to the eye. In a bright light, however, as when we turn to face an electric light bulb for example, the iris will spread inwards leaving only a very small pupil and thus shutting out more of the light which might otherwise prove dazzling.

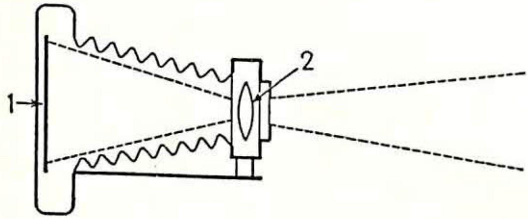

FIG. 1. CAMERA
(1. Sensitive film; 2. Lens)

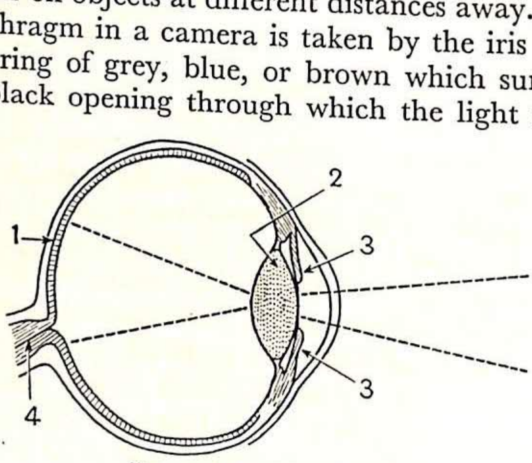

FIG. 2. THE HUMAN EYE
(1. Retina; 2. Lens; 3. Iris; 4. Optic nerve)

The place of the sensitive film in the camera is taken by a series of nerve-endings at the back of the eye-ball. These are known as the retina and are sensitive to different shades of light and dark, and to colours. When an image is projected on the retina by the lens, therefore, the reaction of the nerve-endings to it enables a record of its shape, outline, colour, and so on to be transmitted to the brain by means of the optic nerve, to which all the nerve-endings in the retina are led.

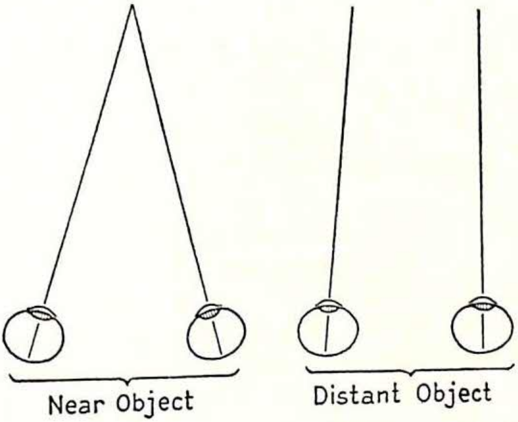

FIG. 3. FOCUSING ON OBJECTS AT DIFFERENT DISTANCES

This—a rather over-simplified description—shows how visual impressions of the appearance of objects around us can be conveyed through our eyes to the brain. We are thus able to "see" the outside world and to distinguish the objects which exist in it. We can also judge the distance of various objects from us partly by the differences in their size, and partly by the fact that we have two eyes which must turn inwards if they are to focus on an object which is close to us, and outwards when they are confronted by something further away.

THE SENSE OF HEARING

In addition to the appearance of the outside world, however, there is the question of the noises which are found in it. When objects are struck or rubbed together or when air is forced through a narrow opening, sound-waves are set going which may be important as a warning of danger or as a means of conveying a message. It is advisable that human beings and indeed most animals should have some means of receiving or "hearing" these sound-waves. This means is provided by our ears.

Some distance within each ear there is a tightly-stretched membrane known as the ear-drum, to which is attached a small piece of bone known as the "hammer." When sound waves strike the ear-drum they cause it to vibrate and this in turn agitates the hammer causing it to beat upon another small piece of bone known as the "anvil." This in turn is connected to a series of tubes filled with liquid in which small hair-like nerve-endings are suspended. As the vibrations from the hammer and anvil pass up and down these tubes they agitate the nerve-endings with the result that impulses corresponding to the original sounds pass up the auditory nerve into the brain.

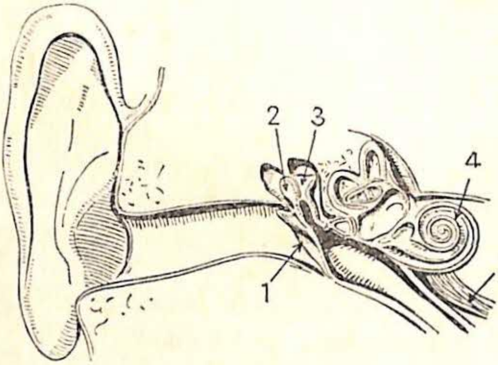

FIG. 4. THE HUMAN EAR
(1. Ear-drum; 2. Hammer; 3. Anvil; 4. Liquid-filled tubes; 5. Auditory nerve)

Differences in the loudness of sounds can be distinguished and differences in the pitch or "wave-length" can be picked up by these nerve-endings. We can also decide where the sounds are coming from by the fact that they tend to strike our two ears in slightly different ways.

THE SENSE OF SMELL

Another "long-range" sense, that is to say one that can tell us about objects at a distance as distinct from those which are actually in contact with our bodies, is the sense of smell. At the top of the inside of each nostril there are *olfactory* cells, and when small particles of gas are inhaled with the air we breathe these cells react to them and send a nerve-current along the olfactory nerve to the brain.

Thus if there is anything in the vicinity which gives off a gas, the particles of which are carried into our nostrils and excite the olfactory cells, we shall be aware of an odour, that is to say we shall "smell" the substance which is giving off the gas.

The sense of smell is not of anything like the same importance among human beings as are sight and hearing. We have, for example, very few names for smells and we have usually to describe them by reference to their source, such as the smell of violets, cigar smoke, or bad fish. At the same time our sense of smell is very quickly fatigued and thus becomes ineffective. It is the newcomer to a factory who remarks that a process has an unpleasant smell; once he has been there for some time he may no longer notice it.

Among animals it is probable that the sense of smell is more acute and more highly developed. In a dog's world the smells and their meaning are much more varied and exciting than in the world of human beings.

THE SENSE OF TASTE

When we take certain substances into our mouths we become aware that they have a characteristic taste. This is due to their coming in contact with nerve-endings called taste-buds which are found in little pits mainly on the tongue, though there are a few situated on the soft palate and around the tonsils.

Any liquid in our mouth, or any solid which is sufficiently chewed and mixed with saliva to be semi-liquid, will run into these little pits and come into contact with the taste-buds. If it is a sweet substance certain of the nerve-endings will react to it and a message to that effect will be sent along a nerve-channel to the brain. If it is a sour substance, other nerve-endings will react and send a different message to the brain; similarly with salt and bitter substances, making up the four fundamental tastes.

Taste and smell are closely linked up, and many of what we imagine to be characteristic tastes of certain things, such as coffee, are in fact odours. If our nose is plugged and we shut our eyes we cannot distinguish coffee from a weak solution of quinine.

THE SKIN SENSES

We are now familiar with the idea that our senses work by means of nerve-mechanisms which are made up of the following parts—

1. Nerve-endings, which are so arranged that they can receive a certain kind of stimulation such as light, colour, and shape in the retina of the eye, sound in the cochlea of the ear, gaseous particles in the nose, and so on. These are called the "receptors," or in simpler language the "receivers."
2. A nerve-fibre, which transmits the stimulation received by the nerve-endings to
3. The brain, where these stimulations are interpreted or understood.

In our skin there are also many nerve-endings, some of which respond to light pressure and some to deep pressure. These are quite separate from each other and send their messages along quite different channels to the brain. They are separate also from the nerve-endings which are sensitive to heat and cold. These can be stimulated separately, and when we touch one with a fine pointed pencil it will send word back to the brain that there is something hot touching the skin while if we touch another of these nerve-endings it will send a message back that it is in contact with something cold.

In addition to these there are also some fine nerve-endings which act as receptors for pain. Pain can result from the over-stimulation of any nerve-endings—think how unpleasant it is to be dazzled by a sudden blinding light or deafened by a very loud noise—but these additional receptors in the skin serve to warn us of any damage or injury to it.

THE KINAESTHETIC SENSE

In addition to these easily recognized senses, we are able to know about the position or movement of our limbs by nerve-mechanisms which end in our muscles and tendons. By means of these we know whether our legs are bent or stretched out without looking to see. In the same way, when we make a vigorous movement such as swinging a hammer we get the feel of it by means of this "kinaesthetic" sense.

THE SENSE OF BALANCE

Besides knowing about the position of our bodies in space, however, we are able to know about our balance from a series of nerve-endings suspended in the fluid which runs in a complex series of canals inside our ears. Any movement of our head causes this fluid to flow back or forward in these canals thus swaying the nerve-endings. From these, messages are conveyed back to the brain about the movement of the head and hence the angle at which it and the body are balanced.

If we are subjected to rapid swaying and changes of balance the movement of the fluid will be considerably greater. This may upset the sense of balance and can produce giddiness and nausea in some people. Those who dislike spending any time in a rapidly rolling and pitching ship are sensitive to these disturbances of the semicircular canals and in consequence suffer from "sea-sickness."

OTHER SENSES

There are also nerve-endings in our digestive organs, sex organs, throat, and other internal parts of our body. Some of these convey information about our physical requirements, as when a sensation of dryness in the throat is associated with thirst or when stomach contractions are linked up with hunger. In other circumstances they tell us something about our bodily state and needs.

OUR SENSORY EQUIPMENT

This discussion has perhaps led us rather a long way from the traditional "five senses"—sight, hearing, touch, taste, and smell. We have, in fact, added at least five more—heat, cold, pain, balance, and the kinaesthetic sense—without exhausting the list. All these senses definitely exist, for each has its own distinct and separate nerve structures, capable of being stimulated by a certain kind of activity and no other, and of conveying information about it to the brain. The brain is situated at the inner end of all these nerve structures and acts as a kind of control room. It has its outgoing channels of communication also, but these do not concern us here; we are thinking of the brain as a receiving station to which information about happenings outside our own body, as well as inside it, passes from the sense-organs along certain nerve-paths.

The workings of the human body are always fascinating to study, and from this aspect we have laid out the details of an interesting and complex picture. Let us put them together in terms of an ordinary person and his means of knowing what is going on about him. Protected by walls of bone in the top of his head lies his brain, at the centre of a complex system of nerves. In front are two eyes which he can move and focus in different directions, and which are constantly picking up visual information of the happenings around him and transmitting them back to the brain. On either side are his ears, registering any noises which are going on and sending them into the receiving station. Protruding in front is his nose, picking up any smells and passing on news about them to the same place. By means of these three senses he can find out about happenings which are some distance away from his body.

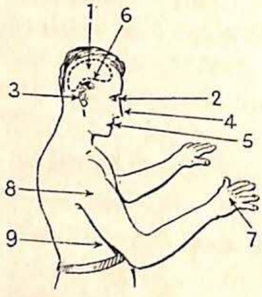

FIG. 5. DIAGRAM OF SENSES

(1. Brain—receiving system;
2. Eyes—sense of sight;
3. Ears—sense of hearing;
4. Nose—sense of smell;
5. Tongue—sense of taste;
6. Semicircular canals—sense of balance;
7. Skin senses—heat, pressure, pain, etc;
8. Kinaesthetic sense—movement of muscles;
9. Visceral senses.)

When our ordinary person comes close enough to touch anything he can bring more senses into play to find out about it. His skin senses will tell his brain if it is hot or cold, if it is pressing on him, or if it is damaging his skin and thus causing pain. He may put it in his mouth and thus bring it in contact with the taste-buds on his tongue which in turn will pass back news about whether it is sweet or sour, and so on. His brain will thus be kept informed about anything that is in contact with various parts of his body.

But his body is mobile, and his arms and legs can be swung in various directions; the kinaesthetic sense will keep his brain in touch with their movement and positions, while if his body swings away from an upright position, his sense of balance will send the appropriate messages to the receiving station.

Should any unpleasant pressures or discomforts arise in his internal organs, information will pass along "the usual channels" so that the brain is warned of any untoward development.

We are equipped, therefore, with a very remarkable series of mechanisms for knowing what is going on outside ourselves, between ourselves and the outside world, and within our own bodies. All our knowledge must come in the first place through the channels of our senses, so that our study must start with this brief sketch of their working. But while the senses provide the raw material, so to speak, a lot has to be done with the information they provide, before it is fully comprehensible.

SUMMARY

1. What are the means whereby we know what is going on within and around ourselves?

All our information comes in the first place through our senses, sight, hearing, etc. Each of these has an end-organ (such as the eye or ear) which is designed to register certain kinds of happening. News of these passes along nerve-paths till it reaches the brain which acts as a kind of receiving station.

2. How does the sense of sight work?

The end-organ is the eye, in which images of the objects in front of it are thrown by a lens on to a sensitive surface composed of nerve-endings at the back (the retina). This can register light and shade, movement and colour, and pass these impressions back to the brain by means of the optic nerve.

3. How does the sense of hearing work?

The end-organ is the ear, within which is a piece of membrane (the ear-drum) which vibrates in sympathy with any sound waves which may strike it. These vibrations are passed by means of small pieces of bone (the hammer, anvil, etc.) into tubes filled with liquid. Nerve-endings suspended in this liquid translate the vibrations into nerve-impulses and pass them to the brain by means of the auditory nerve.

4. How does the sense of smell work?

The end-organs are nerve-endings at the top of each nostril. These react to any gaseous particles in the air which is breathed through the nose, and transmit information about them to the brain through the olfactory nerve.

5. How does the sense of taste work?

Taste-buds located in pits on the tongue and other mouth surfaces form the end-organs. Liquids flowing into the pits cause these buds to react to their taste. The taste-buds then send messages to the brain by means of the appropriate nerve.

6. What does the sense of touch consist of?

There are a number of different kinds of nerve-ending in the skin. Some of these respond to heat and some to cold; some respond to light pressure and some to heavy pressure; some again respond to pain. Each of these end-organs passes its information along an appropriate nerve-channel to the brain.

7. What senses tell us about the position and movement of our bodies?

Nerve-endings in our muscles act as end-organs for the kinaesthetic sense. These transmit information about the position of our limbs or about their movements. Within the ear, there is a complex system of canals filled with liquid which reacts to alterations in our balance. These form the end-organs for the sense of balance.

8. Are there any other senses?

Certain of our internal organs (bowels, bladder, etc.) have nerve-endings in them which can transmit information about changes in them along appropriate nerve-channels to the brain.

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CHAPTER III

ATTENTION AND PERCEPTION

Now that we know something of how an individual keeps in touch with the outside world we have a picture of him receiving a continuous stream of information from his sense-organs, all of which is conveyed to his brain along the appropriate nerve-channels. It may be worth while to pause here for a moment and think what your sense-organs are telling you about what is going on just now. Your eyes will be seeing this line of type; your ears, are they hearing any noises in the room or beyond it? Your nose, can it smell anything cooking, or is it giving you any information about the cigarette you may be smoking? Have you anything in your mouth and if so, what does your tongue tell you about its taste? What about your skin sensations? Your fingers will probably be in contact with the cover and the pages of this book. What temperature are they? Are the pages cooler than the cover? Can you feel the weight of your clothes on different parts of your body, and are you aware of the pressure of your own weight on the chair you are sitting on? Have you any painful spots on your skin, such as where you cut yourself shaving?

Your kinaesthetic sense will be telling you something about the position of your limbs and whether they are in motion or at rest. What do your semicircular canals tell you about your balance? Are you sitting upright or leaning back so that you need support from the cushions behind you? Is there any news from your inside? Or do the nerve-endings there report that all is quiet and comfortable?

If you have carried out this survey of the information given by your senses—or sensations as it is more accurate to call it—you will realize that there is too much of it for you to deal with all at the same time. If you try to think of all your sensations at once, you may succeed in keeping several of them in mind but you will probably be unable to concentrate on what you are reading.

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In day-to-day life, however, if all this mass of sensation is being passed continuously along the appropriate nerve-channels to your brain, how do you in fact deal with it?

MAKING SELECTIONS FROM AMONG OUR SENSATIONS

The answer is, of course, that we remain largely unaware of a great many of our sensations in normal life. Until you stopped to think of the noises, smells, tastes, and pressures about you just now, you had been to a great extent unconscious of them. It was only when you began to pay attention to them that they came into your consciousness.

This brings us to the next question we must consider. Out of the mass of sensation which is presented to us at any one time we make a selection by turning our "attention" on certain items. We single out these sensations and bring them fully into the centre of our awareness, while we allow the remainder to pass unheeded or at the most we let them remain in the margin of consciousness. That is to say, we may be paying attention mainly to what we are reading while at the same time we are pleasantly aware of the taste of a piece of chocolate we happen to be sucking, though we are not giving much attention to it. We may be just aware of the light beside us, but we may be largely unconscious of the warmth of the fire and the position of our limbs as we lie comfortably stretched out in an armchair.

Of course, all this may change quite drastically and suddenly. If the telephone rings we shall shift our attention to lifting it up and answering it, and forget about our book. If a spark leaps out of the fire and sets light to our trousers our attention will move at once to the heat and pain on our skin. And if the fire begins to smoke our attention will be caught by the unpleasant odours which thus assail our nose.

This matter of "paying attention," therefore, means that we make a selection of the sensations which are being presented to us, bringing some into the centre of our consciousness, while others remain on the edge, or outside altogether.

Why do Things Catch our Attention?

In some cases we do not have to make any effort to direct our attention to certain sensations. They call attention to

themselves so that it becomes impossible to disregard t
Is it possible to classify the kinds of sensation which do
and the reasons why they do so? In other words, can we cla
the attention-catching qualities in sensations? If we could, our classifications would have considerable practical significance. In advertising, for example, it is important to know how to catch the attention of passers-by.

Broadly speaking, the intensity of a sensation will have a great deal to do with its attention-catching properties. We might disregard a slight noise beside us, but when someone begins to operate a pneumatic chisel or throw sheets of corrugated iron off a truck they catch our attention without difficulty. The loudness of a sound, the brightness of a light, the keenness of a pain, the strength of a smell—all these have a lot to do with the amount of attention they attract. It is possible to imagine cases where such sensations are of so overpowering an intensity that they leave us practically no attention for anything else. Severe pain, for example, can come near to blotting out our awareness of most other sensations.

Change or movement has a lot to do with attracting our attention. This is illustrated most obviously in the sense of sight, for when we are looking at a landscape any animal or bird which moves catches the eye at once. Nor has this escaped the attention of advertisers or display experts, for a great deal of ingenuity is exerted in devising mechanisms to produce some kind of movement in shop windows—electric signs that change colour, figures that jump about or perform little contortions. An illuminated legend that can switch itself off and on will attract far more attention than one that remains on all the time.

In other cases also, change in the sensation will attract attention: a sound that grows louder or softer, one that starts and stops or changes its note will force us to take notice of it when a continuous unbroken sound might remain outside our consciousness. This fact is known to the accomplished speaker, who continually varies his tone, sinking his voice to a whisper then suddenly raising it on a note of urgency. In this way he can hold the attention of his audience much better than someone with a monotonous delivery who never pauses or changes his tone. Lecturers with this kind of delivery ought not to be surprised when they become aware that their hearers' attention is straying.

Repetition also will attract attention, provided it does not have the opposite effect of becoming monotonous. A single tap might escape notice, while a series might force themselves on our awareness. Continued repetition, on the other hand, might cause them to become so familiar that they would fade into the background of consciousness.

Things which have some kind of systematic arrangement tend to call attention to themselves, whereas those which are merely a jumble will be passed by. Symmetrical patterns and closed figures gain attention—facts which make it worth while to take trouble over advertising layout to ensure that it is well spaced, neatly set out, and surrounded by a border.

Lastly, any novel sensation tends to catch attention. We notice at once any unfamiliar object in a well-known background in the same way as we notice a familiar object in an unusual setting. A policeman's helmet on our family hat-rack would at once catch the eye, while if we are attending a public ceremony the sight of a colleague on the platform will evoke the involuntary remark, "Look, there's old so-and-so."

The Direction of Attention

Attention does not entirely depend, however, on particular sensations attracting it to themselves; to some extent it can be consciously directed. We can say to ourselves, "I am going to listen or watch closely for the next half-hour," and we can be to some extent successful in doing so. Of course, if there is something else going on which tends to distract our attention this will be more difficult, and the greater the distraction the greater the effort needed to keep our attention fixed.

At the same time, attention can be unconsciously directed so that we notice anything which links up with what touches us closely. Birth and death, our own advancement, the fear of disease, these are practically universal in their appeal. We shall be on the look-out, unconsciously but continually, for anything which refers to them.

This fact is of use again in the advertising world. Suggestions that a product appeals particularly to men of distinction will fit into our continuous interest in putting ourselves into that category and we shall be unconsciously on the look-out for anything that supports it. Fear, again, is never far from our minds and we shall tend to pick out and attend to anything which might contain a threat to our security. Horror stories in the newspapers never lack readers.

Temporary attitudes and moods will also affect the direction of attention. When we are feeling rather inadequate and sorry for ourselves we shall be quick to notice any slight or fancied insults. We attend, in fact, to anything which happens to fit in with our interests or attitudes of the moment, and we may remain quite blind to sensations which do not make any such appeal.

What Happens when we Pay Attention?

The actual manner in which we bring our attention to bear on something, or bring a sensation into the focus of consciousness, is fairly complex. If we think of a terrier standing in front of a rat-hole we shall have a good overall picture of attention which we may analyse into the following component parts—

In the first place the receptors of the sense-organs are adjusted so as best to catch the sensations to which attention is being paid. The terrier will be turned to face the hole so that its eyes will be focused on it and its ears will be pricked so as to catch the slightest sound from it.

Secondly there will be postural adjustments: the terrier will stand with its forelegs spread out and its head and shoulders lowered towards the hole. This will involve the third element in attention which consists of certain muscle tensions. If you listen carefully for a few moments you will find that your neck and shoulder muscles have become tensed up and when you stop listening you will be aware of a distinct relaxation in them.

Lastly, and to some extent involved in the foregoing, attention implies an increased clarity of sensation in the area we are attending to. We may be gazing idly about us, but as soon as our attention is fixed the objects in our view will be more exactly focused and will become sharper and clearer. We may be listening to nothing in particular, aware of a vague jumble of sounds about us, but when our attention is caught we shall distinguish the individual sounds more carefully from the background.

PERCEPTION

Knowing what is going on in the outside world, however, is not merely a matter of paying attention to a certain sensation. Something must be added before the result has any meaning.

In the first place, we shall probably have several different sensations from an object at the same time. Suppose we are presented with an apple: our eyes will inform us that it is approximately spherical in shape and that it is green, yellow, and red in colour; our fingers will tell us that it has a smooth skin which is cool to the touch and that the indentations in either end have a harder, slightly brittle substance in them.

When we put this object to our nose we shall be conscious of a sweet but rather sharp odour from it, while if we shake it beside our ear we may hear something rattling inside. If we bite the object we shall find that beneath the skin there is firm flesh from which some drops of liquid run and which has a pleasantly sweet, tart taste.

All of these sensations added together constitute our experience of the fruit, though they came from different groups of sense-organs. The first thing that happens to simple sensations, then, is that they must be given some sort of organization, and those which emanate from the same source must be grouped together, whether they come through eyes, ears, nose, and so on.

This process of organization goes on all the time and it is an essential element in our understanding of the outside world. It is an active process; that is to say, it is something we ourselves do to the sensations presented to us. We shall get an entirely wrong impression if we think of our minds remaining passive while information comes to them along the sensory nerves. We are, in fact, busy all the time putting different sensations together, comparing them with each other, moving our heads to get a better view and adding more sensations to complete the organization and make it more meaningful.

Relating Sensations to Past Experience

But in addition to this grouping and organizing of our sensations there is some reference to sensations we have had in the past and to the ways we have represented them to ourselves.

For example, when we have arranged the sight, smell, feel and taste of the object referred to above we shall say to ourselves "This object is substantially the same as the ones which have given me the same set of sensations in the past. These objects I have been accustomed to think of as 'apples,' for I have heard other people speaking of them in that way." We thus classify our new sensations in relation to those we have had in the past and so give meaning to what our senses tell us about the outside world.

This process is known as "perception" and it is going on all the time. To a great extent it depends on past experience, for we arrange our new sensations in terms of our previous knowledge. Even though we have never had exactly the same set of sensations before we are likely to say to ourselves "Here is something which looks red and spherical, it has a fruity smell and feels cool and smooth. When bitten it is softer and more liquid than an apple and has rather a different taste." We learn in due course that this object which in many ways resembles an apple though it differs in others is called a tomato.

In many cases, of course, we work on only a limited number of sensations from an object. The mere sight of an apple will be enough for us to recognize it for what it is, while we shall call up for ourselves images of the other sensations we should expect to get from it. Similarly, when we recognize a house, we only see the near side of it and perhaps one end and part of the roof. We supply the far wall and the other end from our previous experience of houses as well as the space inside which we should expect to find split up into rooms.

The Perception of Wholes

It is important to make clear that we do not add up our individual sensations one by one and make sense of the total but rather that we see the pattern from the word go. The organization is implicit in the perception, not something which is added afterwards. Take, for example, Fig. 6 on the following page.

We do not see eight small circles and then arrange them in the form of a diamond; we rather perceive a diamond-shaped figure, and then note that it is made up of eight small circles.

This has been made clear by the investigations of the *Gestalt* school of psychologists.

The word *Gestalt* is German and means "shape" or "form." It has come to be used in psychology in the sense of a whole-made-up-of-parts, and emphasizes that the whole has a quality which is over and above the sum of the individual parts. Perhaps the word "pattern" or "configuration" would convey the meaning just as well, but the original word *Gestalt* continues to be used.

The distinctive contribution made by the *Gestalt* school is to correct the tendency towards thinking of perception as a process of adding sensations together one by one until the total picture emerges. This tendency is probably inevitable when one tries to explain the perceptual process or to describe how sensations are organized by our minds. It is necessary to be clear, however, that what we perceive first is the organization of the sensations; we see a pattern or hear a tune. The separation of the different colours or the splitting up of the individual notes is something that happens later.

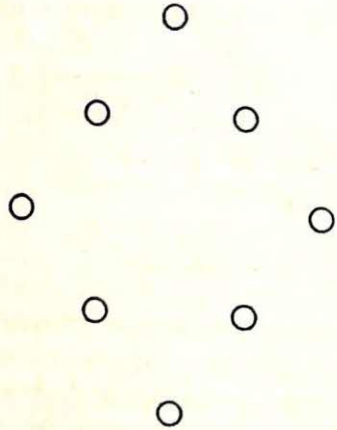

FIG. 6. THE PERCEPTION OF WHOLES

Mistakes in Perception

This habit of supplying the missing parts sometimes leads us into mistakes. When we see a large jug standing in a basin on the wash-stand of a rather old-fashioned hotel we usually assume it to be full of water and thus fairly heavy. If we go to lift it up and it turns out to be empty we shall get a slight shock when its weight proves to be so much less than we had expected. There has been a fault in the perceptual process, that is to say we have organized our sensations about the jug and related them wrongly to our past experience of such objects, the result being that we thought we were confronted by a full jug, when in fact it was an empty one.

Such mistakes happen when the context leads us to supply qualities to an object which in actual fact it does not possess.

There are a few well-known illusions which illustrate this, such as the Muller-Lyer illusion of two horizontal lines with "whiskers" on the end. The one below appears longer to most people because of the context, i.e. the "whiskers"; these being differently arranged in the line above tend to make it appear shorter.

An equally fruitful source of mistakes in perception is our own expectation or mental set. If we are expecting a particular bus for example, and another with superficial similarities turns up instead, we may step aboard without noticing the difference.

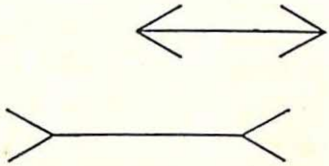
FIG. 7. THE MULLER-LYER ILLUSION

In the ordinary way of life, however, such mistakes are relatively infrequent, rather surprisingly so when we realize how far our normal perceptions depend on a limited number of sensations, a familiar context, and a particular set of expectations. If we went through life examining everything from every angle before we made up our mind whether it was a chair, a table or a bookcase, we should never be able to compete with the mass of sensation which is presented to us. There is no time for all this, and in point of fact we arrive at most of our perceptions by a very few sensory cues related very quickly and at times superficially to our previous experience.

SUGGESTION

There is, however, one point about these mistakes in perception which we might consider further: this is the question of suggestion. When we are led to assume the presence of something which is not actually there it is due to our adding up our sensations, relating them to our previous experience and getting the wrong answer. Sometimes this happens when the cues are so arranged that we are led to expect the wrong total situation, and sometimes it is due to the wrong mental set in ourselves. Either way the wrong answer has been *suggested* to us.

Suppose, for example, we are walking across a moor and we see a patch of green vegetation which appears to be growing on solid ground. When we step on it and it sinks beneath our weight we realize that our assumption was wrong and our new and more correct perception is of a piece of marsh. The original and misleading perception of solid ground was suggested by the appearance of the vegetation and our own eagerness to get across the moor.

Many of the practical jokes which so amused the last generation depended on this process of suggestion. Sir Osbert Sitwell describes a chair, purchased by his father for the entertainment of visitors, which presented an appearance of great strength and solidity; it suggested, in fact, that it would be capable of supporting the weight of any normal person who wished to sit down on it. The chair was, however, so constructed that when sat upon it collapsed at once, a situation which Sir Osbert's father thought vastly amusing until by mistake he sat on it himself. Any "joke-shop" will furnish examples of similar bits of apparatus designed to suggest a misleading total situation.

The Role of Other People in Suggestion

The intervention of another individual, however, opens up wider possibilities of suggestion. When the sensory stimuli are vague and indefinite it is sometimes possible to make people see or hear what is not there by judicious prompting. The same happens when experience becomes difficult to classify. To some extent the prestige of the person making the suggestion will affect the situation; if the managing director sees a small fault in something there is usually a number of others who will quite sincerely see it also.

At the same time, individuals vary in the degree to which they are suggestible. Various tests have been designed, one of which consists in playing a gramophone record which repeats the words " You are falling, you are falling forward," in an urgent and insistent tone. Some people can be made to sway noticeably back and forward when listening to this record and even to lose their balance. Others remain quite still and unaffected.

Past experience can be distorted by means of suggestion and people can be made to remember things that never happened. Situations have been arranged where someone comes into a classroom while a lecture is going on; such an incident will be noted by most people but few will pay much attention to the details. If they are asked later "How many books was he carrying?" such a question will suggest that he had at least two. The members of the class will therefore reply with random numbers, such as "three," "four," "two," and so on, though in fact the intruder was empty-handed.

SUMMARY

1. Can our brains deal with all the sensations which are being transmitted to them at any one time?

No. Our various sense-organs are pouring in too great a mass of information for them to deal with. We must make some kind of selection, bringing certain sensations into the centre of our awareness, while certain others may remain on the edge. The remaining sensations are largely disregarded. This process of selecting certain sensations is called attention.

2. What causes certain sensations to catch our attention more easily than others?

Attention depends to some extent on—

(*a*) the intensity of a sensation (loudness of a sound, brightness of a light, etc.);

(*b*) whether it changes in intensity or position;

(*c*) whether the sensation is repeated;

(*d*) the systematic arrangement of sensations;

(*e*) whether the sensation is novel or unexpected.

3. Does the catching of attention depend solely on the sensation?

No. We can direct our attention consciously on certain things. At the same time it may be directed unconsciously by our desires, our fears or our particular interests.

4. What actually happens when we direct our attention in some particular way?

Our sense-organs will be so directed as to catch any sensations which may come from that particular quarter, and our posture will be adjusted so as to facilitate this. Certain muscle tensions will develop in the effort to focus our sense-organs in the desired direction so that any sensations will be as sharp and clear as possible.

5. Is our understanding of the outside world simply a matter of receiving sensations?

No. Crude sensations by themselves are of very little use. They must be organized, those from the same source which come through different sense-organs being put together, and related to our previous experience. This process is called perception.

6. How far is perception an active process?

Very largely. Our minds must constantly be at work on our sensations; otherwise they will have little or no meaning. In normal life we work on a surprisingly small number of sensory cues, supplying a large part from the context or from our previous experience.

7. Are our perceptions always accurate?

Not necessarily. By relying so much on the context and by supplying the missing elements for ourselves we may occasionally make mistakes. This is particularly so when the context is misleading or when our own expectations lead us to supply evidence which is not in fact there.

8. Can these mistaken perceptions be influenced by other people?

It is possible so to manipulate the context that an individual is encouraged to supply incorrect additional evidence for himself. This process is known as suggestion.

9. What factors cause suggestions to be effective?

The strength of an individual's own expectations will cause him to respond more easily to suggestion, though here there are wide differences between individuals. The prestige of the person who makes the suggestion will have a lot to do with its effectiveness.

CHAPTER IV

IMAGERY, MEMORY, AND THINKING

While we rely on our senses to tell us what is happening in the world around us, not all of our experience depends on our senses. It is possible to lie with our eyes shut in a sound-proofed room and have quite an exciting time, though none of our sense-organs is actually stimulated. We can, for example, imagine the tinkle of a mandolin, or the rumble of an approaching tank, we can smell again the perfume of a rose or call up the image of a mountain landscape before our closed eyes. This power of experiencing sensations without the stimuli being actually present before our sense-organs—of smelling a rose when it isn't there—is known as "imagery" and is a very important element in our mental life.

IMAGERY

Images are of various kinds, some being straightforward recollections of what has already happened. We can call up an image of old so-and-so's face when he realized he was drinking the managing director's coffee; or of the horrible crashing noise we heard when the bus hit a lorry broadside on. These images are simply a second showing, so to speak, of sensations we have already had.

But we can also call up images of things that have never happened, or which are never likely to happen outside a cinema. We can imagine a dog saying "Blimey! Call this a bone?" or an all-in wrestling match taking place in Westminster Abbey. We have never seen or heard of these occurrences, though we may have experienced their constituent parts—an all-in wrestling match in a sports stadium and a service in the Abbey. We have put the parts together into a different pattern in our imagination, and so, to a certain extent, we have created something new.

Since images are rather like sensations which happen without the appropriate sense-organ being actually stimulated, it follows that we can have as many different kinds of images as we have different kinds of sensation. This is, in fact, the case and we have talked above of visual images, when we call up a picture of something we have seen or might see, such as the wrestlers or the Abbey service. We have also talked of auditory images, when we imagine a sound such as the crashing of glass. We can also have kinaesthetic images, as when we think of swinging a golf club or aiming a blow at someone we dislike, and we can have images of pain, heat or cold as when we reproduce the sensation of putting our hand into very hot water, and feel again that split second's delay before the pain really makes itself felt. We can also have olfactory images as when we think of the smell of flowers or of food being cooked.

Individual Differences in Imagery

When we try to study the imagery of different people we come across various difficulties. In studying sensation, for example, it is not difficult to control the stimulus, say by increasing the temperature of two metal plates each by so many degrees at a time. We can then say to an individual "Which of the two is the hotter?" with some expectation of getting a fairly precise and sensible reply. But images do not depend on the actual stimulation of sense-organs, in fact they are quite independent of them, for some people can imagine a symphony of Beethoven's through the din of a pneumatic drill. At the same time, images are much less steady and distinct than sensations and if, having persuaded someone to imagine the smell of orange blossom, you ask him if the image is still strong and distinct, he may have to confess that the elusive perfume of the flowers has turned into a strong odour of fried onions.

With all these difficulties, however, it has proved possible to find out a little about imagery and to compare the relative clarity of different images and the frequency with which they occur in our mental life. Visual images seem to come first on the list, being both clearer and more definite, and occurring more often than others. This is not unexpected, because of the great importance of sight to man and because images in other senses are frequently accompanied by visual images as well. If we try to imagine the taste of a fried potato chip we shall usually think of the appearance of one at the same time.

Auditory imagery seems to come next on the list. Again this is not unexpected, for sounds play the next most important part to sight in our sensory experience. The least clear and the least frequent images in human experience seem to be those of pain and smell. The latter sensation plays only a minor part in our ordinary life, though in the life of certain animals it is of much greater importance.

But the studies of imagery have brought to light another fact of great practical importance: this is the difference in individuals' power of imagery. While to most people visual imagery is important, there are some to whom auditory or kinaesthetic imagery is of much greater importance. Such people will tend to think in terms of the sound of peoples' voices rather than their appearance, the "feel" of tools and movements rather than their shapes or the drawings from which they are made. When a highly skilled workman happens to think of his job in these ways he may find it very difficult to pass on his knowledge to others and indeed when we talk to such people we may be aware by their halting speech and continual gestures that they are having great difficulty in expressing themselves. It is not uncommon to hear a tradesman say, "Oh, I can't explain exactly what I mean, but if I had my tools here I could soon show you."

Cases where Images can be Confused with Real Life

In ordinary life there is not much danger of mixing up images with actual sensations of what is happening around us, though at times faint sensations can be confused with images. If someone is made to listen to an irregular succession of very low sounds he can sometimes be persuaded, by such questions as "Wasn't that one now?" or "Did you catch that one?" to hear what is not actually there. Similarly with very faint pictures on a screen, people will sometimes mistake one of their visual images for reality. This links up with what we were saying about suggestion, but such examples are of little significance in ordinary life.

When people do begin to confuse their images with happenings in the real world, we think of them as ill in some way or other. There is a certain condition, much beloved by music-hall comedians, in which an individual who has been drinking seriously over a long period imagines that he is being pursued by long slimy snakes and may even see and feel them crawling over his body. Such images are called hallucinations, and while they may be very tragic and distressing when they occur, they belong to the realm of mental or physical illness rather than to the ordinary experience of the normal person.

There is, however, one type of imagery in which images are so sharp and distinct that they seem almost to have the steadiness of real sensations. This is known as *eidetic imagery* and is quite usual among children between the ages of ten and fifteen, though it is not very common among adults. If we look at the following arrangement of letters for about a minute—

X	R	B
L	J	Z
C	F	Q

the normal person is usually confident that he can repeat the letters in the order in which they are normally read (XRB LJZCFQ, beginning at the top left-hand corner and reading each line in succession from left to right). He would, however, be quite confused if he were asked to read the letters off from right to left, without looking at the square. Anyone with the power of eidetic imagery, however, will have such a steady and distinct image in front of him that he will have no difficulty in reading them from right to left, from top to bottom, diagonally, backwards, or in any order desired.

The Place of Imagery in Mental Life

How far is imagery important in our mental life? It may seem rather a waste of time to try to call up a picture of a tree when we are sitting indoors, or to reproduce in imagination the flavour of chocolate on our tongue. In effect, however, it is upon this capacity to experience things in their absence that all mental life ultimately depends. If we had no powers of imagery we should have no awareness of anything except what is actually present to our senses; we should be confined to the immediate present without any ability to recollect the past or to anticipate the future. Our powers of invention would be negligible, and we should be unable to solve any problem that was not immediately present to our senses.

Images are to a great extent the basis for ideas, and we find it difficult or impossible to conceive of anything without some kind of image of it in our minds. Abstract thought, therefore, is greatly facilitated by the use of images, and we can communicate these thoughts to each other by means of them. In many cases we can make use of our images as a means of communication in the shape of maps or diagrams; indeed the more use we make of these in teaching or lecturing the easier will it be for others to understand what we mean and the more certain that they will remember it accurately.

MEMORY

Memory has a certain connexion with imagery, for it can be thought of as the power of calling up images of what has happened to us in the past. An experience, such as a series of sensations forming the basis of a perception, does not just happen and then pass away. It leaves some kind of trace of itself behind in our minds. These traces may be fleeting, as when the experience has attracted little attention to itself, or they may leave a deeper impression.

Traces of previous experience remain in our minds for a surprisingly long time; occasionally one realizes that events in remote childhood are still present somewhere in one's consciousness along with happenings of more recent date. Some people have gone so far as to say that everything that has ever happened to us has left some kind of trace behind it which is still somewhere in our minds.

These traces can be brought to mind, sometimes with considerable vividness. This is what happens when we recall certain experiences; for example, when a friend says, "Do you remember that delightful day we spent together on the moors?" we call up images of the feel of the sun and the wind, the vista of heather and gorse, the smell of flowers and the sensation of physical fatigue after a long day's walking. His remark has caused us to experience something of these sensations again in the absence of the original conditions and some time after the event.

It is in some manner like this that memory works. Filed away in our minds are the traces of all kinds of experience. This *retentive* process is largely unconscious and sometimes causes surprise when we realize how much is stored away. When we *recall* any of these traces, we bring an image of the original experience into our consciousness and in a manner we go through it again. When something in our actual experience links up with a trace in our minds we *recognize* it and can thus relate it to the original experience. What is called "remembering" in ordinary speech involves some or all of these processes.

Recall and Recognition

Recognition is a much simpler process than recall, for if we see or hear something that links up with a trace in our minds recognition takes place automatically. Most people are familiar with the experience of meeting someone after an interval; recognition takes place at once and the images of where and how previous meetings took place come into the mind by themselves. Likewise one hears people frequently saying "I can't just call it to mind, but I should recognize it if I saw it."

When we try to recall something, that is to say when we voluntarily make an effort to call up an image of the original perception, we sometimes have difficulty. For example, if someone were to say to us "What was the name of the lady who was concerned in the early development of radium?" we might have to cast about for some time before we could recall it. We might go through any experience of hearing lectures or reading articles about the subject, we might perhaps recall that it was a French name, and that French ladies are called Madame or Mademoiselle, until finally we hit upon the name "Madame Curie." All this might happen quite quickly or it might take some time, depending on a number of factors.

Factors Influencing Recall

For example, if we worked in the radiology department of a hospital and during our training had heard continual reference to the work of the Curies we should probably be able to recall the name at once. This would be due to the fact that we had heard the name repeated many times, because *repetition* of an experience makes it easier to recall.

At the same time, if we are radiologists, the name "Curie" will have a great deal of *meaning* for us, because so many of the early developments, and possibly parts of the modern technique, will derive from their work. To a radiologist the name "Prince Monolulu" will have little or no meaning (unless he happens also to be a racing man) and it would be correspondingly difficult to recall.

Another factor which makes things easy to recall is the *intensity of the original stimulus*. If we have ever been in a position of great danger, when we were thoroughly frightened and were only extricated after almost having given up hope, we shall have little difficulty in recalling the experience. When we hear people saying "I shall remember this to my dying day" they are probably speaking the truth, provided that the incident has really had a powerful effect on them.

In one way, however, recall of such experiences is not quite so simple. We may find no difficulty in recalling the general form of the incident but the details may become blurred and distorted. This will be illustrated when we hear witnesses giving an account of an accident—that it was all very terrible, but as to whether the cars were above or below the cross-roads, which side of the road they were on and which one was turning in which direction, there will be little or no precision and very slight agreement. The psychology of witness or testimony shows how difficult it is to get an objective and accurate account of the facts some time after.

Forgetting

When the traces of previous experience fade in our minds we "forget." To some extent this happens when we have no cause to recall them, but there are too many curious examples of people recalling events in remote childhood for us to be certain that they simply fade out through time until they are not there any longer. It seems more likely that the traces are covered up or blocked by other traces of a similar nature. We may remember a telephone number such as Holborn 2277 when we are using it every day, but if we move to Hilton 3388 the second number will overlay the first one until we no longer remember it.

Our mental life is so lively that we are constantly gathering traces of many different kinds; when these follow thick and fast one upon the other there is little chance of any remaining clear and undisturbed in our minds for long.

There are also emotional elements in forgetting, and some experiments suggest that we forget those experiences which have been unpleasant or damaging to our self-esteem. Shock, illness, or emotional disturbance may also have an effect in obliterating, covering up or distorting the traces in our minds.

The process of forgetting can be measured by making people learn various kinds of material off by heart and having them repeat what they have learned each day after. The amount retained can then be measured and plotted on a graph as above These curves show that forgetting happens quickly immediately after the event and then more slowly; also that the more meaningful the material the less is forgotten.

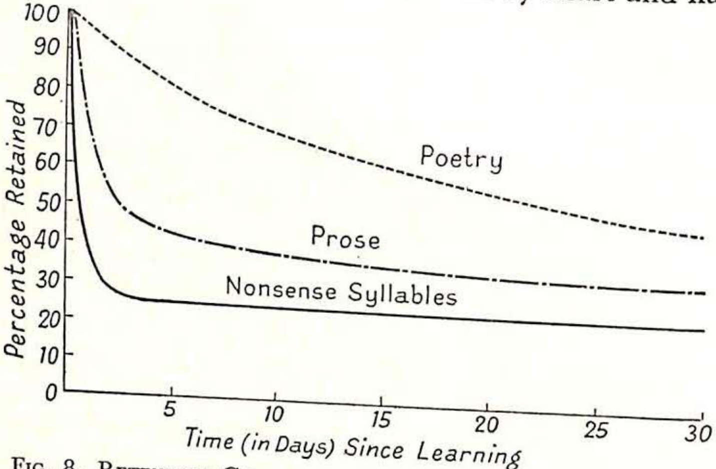

FIG. 8. RETENTION CURVES FOR DIFFERENT TYPES OF MATERIAL
(After J. P. Guildford: *General Psychology*)

Memory Training

Some of the foregoing can be put to use in improving one's ability to remember certain things. For example, in study it is advisable to read with concentration so that the original experience of the material will be fairly intense. Passive staring at the words on a page will be of little value.

Next, it is well to practise recalling the material you are studying. Rehearsing the main points or writing up summaries will make it easier to recall what you want to learn. This may be facilitated by the use of mnemonics or jingles in which the key points can be memorized by rote, such as those which are, or were, used by Latin masters—

"A dative put remember, pray,
After envy, spare, obey, . . ." etc.

THINKING

As we have seen, we are provided with a number of ways of dealing with experience, over and above the actual happenings about which our senses inform us. We have memories of what has happened in the past and images of what might happen in the future and we can fit these together in different patterns so as to try out what might be useful in different situations. This is the process which we might call thinking, and it can vary from mere day-dreaming in which we imagine ourselves as having become suddenly wealthy, to realistic and purposeful reasoning-out of a solution to a particular problem.

In its simplest form reasoning can be seen among certain animals. Presented with a series of doors, several of which open at the same time with food being found always through the middle one, they can remember enough of their previous experience and interpret it sufficiently accurately to go directly after a while to the middle door when a new set is placed before them. So long as the connexions between experiences remain thus simple, obvious and immediate, some animals can work them out for themselves quite as well as small children up to the age of four or five. As soon as the situations become more complex, however, the very limited powers of the animal become apparent and it fails to be able to deal with them.

Thinking to Some Purpose

Purposive thinking or reasoning is generally called into play when we are confronted by a difficulty of some kind. So long as we can carry on in our routine manner, meeting the usual situations in the ways that have proved adequate before and living by means of our habitual modes of response, we are not called upon to reason, and most of us do not do so. As soon as these habitual modes of response let us down, however, and we must find a new solution to our problem, we are forced to begin reasoning.

One important step is usually the putting forward of hypotheses, or possible explanations. These will probably be in the form of questions. If a motor-car suddenly stops we ask ourselves "Has it run out of petrol?" thus putting forward the possible explanation that it lacks the fuel on which the engine must run. If people look surprised at our appearance we shall ask ourselves "Have I a smut on my face? Is my hair tousled, my dress in disarray, or have I forgotten some essential article of attire?" thus running over a whole series of such hypotheses.

These hypotheses usually depend on past experience, and their number and adequacy will be largely determined by how much we know about the subject in question. The man who knows a lot about motor-cars will be able to produce many more possible explanations of a stoppage than he who merely knows how to drive and where to put in the petrol, oil, and water.

Checking our Hypotheses Against the Facts

Our possible explanations are next evaluated and checked. Much of this can be done symbolically or "in our head." When thinking about our motor-car which has stopped we can say to ourselves, "It can't be short of petrol because I had it filled up yesterday, unless perhaps it's sprung a leak or someone's syphoned some out. It can't be the battery because the horn's still working. There might be a stoppage in the feed pipes or perhaps something's gone wrong with the petrol pump. I'll have to look." Thus before we begin investigating we may have discarded several hypotheses and produced others which we can set about checking by experiment.

This interaction between symbolic processes and real life experience is characteristic of human thought and vastly increases the range of experience that can be dealt with. If we were confined to the actual sensory experiences before us we should have only a limited range of possibilities to try out, while if we had no contact with the facts of experience at all we might become unrealistic and impractical. When we alternate between trying things out in practice and thinking of new possibilities in our heads we begin to forge ahead rapidly and to increase our range of action.

Mental Set

The problem about which we are reasoning gives direction to our thought, and ensures that we shall recall experiences that are likely to be relevant. When we get stuck in a motor-car we call up all we ever knew about its workings in an effort to hit on the right explanation for the stoppage. This happens to some extent automatically, for the "mental set" engendered by the problem will ensure that everything relevant comes to the surface. The solution of the problem thus becomes more easy to find, for our mind is crowded with material to work on and we put together various bits of experience and pull them about until we get the right answer.

There may be times, however, when our direction may be the wrong one, and a misleading suggestion at the start may throw us off on the wrong track and make the solution harder by calling up all the wrong associations. This can be illustrated by the Radio programme "Twenty Questions," when occasionally an answer, given in perfectly good faith, creates a misleading impression and sets the questioners off on a wrong track. In the same way, when we are thinking something out we may make a mistake, call up the wrong sort of memories and experiences and get a long way down a blind alley before we realize the mistake and retrace our steps.

Language

This process of trying things out symbolically is greatly facilitated by the use of language which in a sense forms a vehicle for thought. More particularly it enables us to express concepts in which are summed up common aspects of things. The word "tree," for example, sums up a great number of things we have experienced, many of which differ quite considerably from each other. Unless we could file them all away neatly in our minds under that heading we should have great difficulty in dealing with such concepts as "That green thing with branches in the churchyard which is like the other green thing in the field which is like the other green thing in the orchard only it is a little smaller," and so on. When all these green things with branches can be grouped together into one concept and given the name "tree" they become much easier to deal with.

The more similarities we see among our experiences the more ideas or concepts we form and the more words we need. These concepts are in a sense condensations of experience, by means of which we isolate the same aspect of a number of different things. Think of the colours for example: we have all seen hundreds and thousands of brown things—brown boots, brown bread, brown cows, and brown earth. This word "brown" isolates and brings together the common aspect in all these things and enables us to apply that concept to various new or imagined experiences.

The more complex our appreciation of experience becomes, the more concepts we shall have and the more words we shall need. This is the difference between the child's simple "Man go in house" experience, and the grown-up's deeper realization that a well-dressed stranger with an air of importance and an assured manner has entered the Town Hall where all the municipal business is transacted, presumably to pay his rates, get a licence for something, or confer with the town clerk about some important development.

The "Private World" in which the Individual Lives

It will already be obvious that what we are aware of at any one time is no more than a *selection* from the sense impressions that are crowding in upon our nerve-endings. The processes of attention by which this selection has been made have already been discussed, and it will be realized that we are disregarding a great deal more than we are actually taking in. But, in addition to making this selection, what we are aware of is also an *interpretation* of these sense impressions in terms of the concepts which are called up by them. The sense impressions by themselves have no meaning, for they are no more than stimulations of certain physiological mechanisms in our bodies. "Meaning" is something we add for ourselves and it depends almost entirely on the concepts which are brought into play by the sense impressions. Thus, the green things with branches referred to above are only meaningful when they are interpreted by the concept which we have formed in our mind and labelled "tree" and which we know is also used to interpret the same kinds of sense impression by the people among whom we live.

Two people, therefore, presented with the same range of sense impressions, may not each make the same selection and interpretation. The attention of one may be directed or manipulated in a different way from that of the other, while each may attach different concepts to these sense impressions. Thus, each may have an entirely different experience in that same external situation, for each one is having that experience in his own "private world" of selections and interpretations of what is going on around him. This concept of the "private world" is an extremely useful one in the understanding of one's fellow men, for it not only calls attention to the impossibility of entering fully into the experience of another person, it also opens up the subject of differences between the "private worlds" of different people. The dweller in a primitive community, where the concepts in common use are simple and practical and concerned with the routines of everyday life, will have a vastly different experience from the sophisticated Londoner if the two meet on the escalator in the Piccadilly Circus Underground Station. Moreover, the difficulties which each will have in communicating with the other will be considerable, for language is only effective if one can be sure about the concepts which each word will call up in the mind of the other person.

Some people's "private worlds" are very simple straightforward places, for they only use a limited range of fairly obvious concepts to interpret their experience. If such a person begins to extend the range of his concepts, however, and if he learns to use more subtle and sophisticated ideas, he will begin to be aware of a great deal more of what is going on around him. The process of education ought to have this as its major aim—to increase the range and subtlety of the concepts which the individual can use and so widen and deepen his awareness of the world and of his own potentialities. One of the functions of art and literature is to enable ordinary people like ourselves to share the experience of the artists and writers and others of great sensitivity and deep awareness by looking at their interpretations in the shape of pictures or writings.

The solving of problems also is carried out in one's "private world." Faced with a difficulty, as has been pointed out above, one calls up all the concepts which bear upon the situation and juggles them around until the right interpretation appears. This is the process of human invention for, by such jugglings around, sometimes the flash of insight happens which leads to a new development. A very long time ago, one of our remote ancestors had such a flash when he got the idea of pushing a stick through a hole in a round piece of wood. This is basically the concept of the wheel, and one does not need to stress its importance in human development. It seems so obvious to us now that we take it completely for granted, but still, no other animal has had that particular flash of insight. The "private worlds" of human beings, therefore, are much more complex and interesting places than those of even the most advanced animals, though again there are considerable differences between one human being and another. It is an interesting and perhaps useful exercise to try to enter in imagination into the "private worlds" of some of our more intellectually distinguished contemporaries. For one of the things which it is within our power to do, and which makes a vast difference to our personal development, is to increase our equipment of concepts, improve our ability to manipulate them and generally make our "private worlds" more interesting and exciting places in which to live.

SUMMARY

1. What is imagery?

Imagery is the power to experience sensations without the sense-organs being actually stimulated. We can have images of sensations which have happened in the past or of things that have never actually happened. We can have as many different kinds of image as we have senses.

2. Do we all have the same kind of imagery?

This is difficult to say, for images are vague and shifting and tend to disappear when we try to examine them closely. Generally speaking visual and auditory images seem to predominate but different people seem to find one type of imagery coming more or less naturally to them.

3. Are images ever confused with real-life happenings?

Only in cases where we are dealing with very faint indistinct sensations or in illness when we see hallucinations. Children sometimes have very sharp distinct images (eidetic imagery) but they do not confuse them with real life occurrences.

4. What is the use of imagery?

It enables us to experience things in their absence, either re-living past events or anticipating future happenings. Without imagery our mental life would be confined to what is immediately in front of our senses.

5. What are the three elements in memory?

(*a*) Retention, through which traces of our previous experience remain in our minds.

(*b*) Recall, when we bring these traces back into our consciousness and to some extent re-live the experience.

(*c*) Recognition, when we realize that an experience we are having now is similar to one of which there is a trace in our minds.

6. What makes an experience easy to recall?

(*a*) The intensity of the original sensation.

(*b*) How much meaning it had for us.

(*c*) How often it was repeated.

(*d*) The general form which may remain in our mind, though the detail may be forgotten.

7. What are the causes of forgetting?

(*a*) The fading of the original traces.

(*b*) The covering up of them by traces of other similar experiences.

(*c*) Shock or their association with unpleasant experiences.

Forgetting happens rapidly at first and then more slowly.

8. How would you describe the process of thinking?

When we rearrange the experiences we have had into different patterns and by seeing resemblances between them, try out various possibilities and new conformations "in our head" we are thinking.

9. What is the point of thinking?

When our routine methods of dealing with a situation prove ineffective we must think out a new way of dealing with the situation. But not all thinking is purposeful; it may be mere day-dreaming.

10. How do we think out a solution to a problem?

By working out possible explanations or hypotheses and trying them against the facts either in real life or in our heads. The more we know about the problem the more useful hypotheses we shall be able to produce.

11. What gives direction to our thinking?

Usually the problem before us sets us thinking along certain lines, calling up experiences which seem relevant, enabling us to produce suitable hypotheses, and in other ways enabling us to find the solution. Sometimes, however, a wrong mental set will make it more difficult for us to find a solution.

12. Has language anything to do with thought?

We can only deal with experience in thought if we can classify its different aspects under various concepts. We need words to express these concepts precisely. The more concepts we have the more words we shall need.

13. What is the "private world" in which the individual lives?

Each of us makes his own selection from what is coming in through his sense-mechanisms by the process of attention. We also make our own interpretation in terms of the concepts in our minds. Not every one makes the same selection and interpretation, so that what we are aware of at any one moment is a personal and private experience. Those having a wide range of concepts will live in a more interesting "private world" than those whose equipment of concepts is simple and obvious.

CHAPTER V

THE LEARNING PROCESS

BABIES come into the world puny and unprotected, completely at the mercy of circumstances. Yet in a few years' time they are able to look after themselves to a remarkable extent. This development is in great measure a matter of learning.

Primitive peoples can only provide for their elementary needs by methods which are generally unreliable and inefficient. Their life together is poor and simple compared to the modern industrial community with its high material standard of living and its complex social and cultural life. Part of the difference may depend on the latter's greater resources of technique and materials, but mostly it is a matter of modern man having learned more about how the resources of nature can be exploited and more of the skills on which this depends.

Human development, therefore, is largely a matter of learning. Each year of his life the individual learns more about what goes on around him, while each stage of a community's development depends upon its members learning new skills and ways of thought, new and more complex relationships. If we are to understand human behaviour, therefore, we must know something about the learning process, for learning goes on more or less continually throughout the life of individual and community alike.

THE CONDITIONED REFLEX

Probably the simplest form of learning is found among animals. By a process known as "conditioning," new behaviour-patterns can be grafted on to those which already exist.

This is probably best illustrated by the experiments of Pavlov, a Russian who was engaged some years ago on the study of digestive processes in dogs. He noticed that the sight and smell of food stimulated the secretions which assist digestion, that is to say when a hungry dog is presented with a savoury-smelling plate of food, saliva will dribble from its mouth, while certain gastric juices will flow in its stomach.

Anyone who has had any acquaintance with dogs will know that this is so, at least so far as the saliva is concerned, for it is an automatic reaction, or reflex action, which happens with any hungry dog whenever food is presented to it.

Pavlov found that if something else happened every time a dog was presented with food this other happening would become so associated with food in the dog's experience that after a time the other happening would be sufficient by itself to start the dog salivating. For example, every time a dog was fed a bell was rung; the dog naturally salivated when its dinner appeared, but after a few days the dog would salivate as soon as the bell was rung, even though no food was presented to it. The dog had, in fact, learned to associate the sound of the bell so closely with the appearance of food that the reaction which the latter automatically brought forth was now called into action by the former. The dog had, in fact, been conditioned to salivate at the sound of a bell.

In case this sounds rather a futile pursuit for a scientist to spend time on, we must, in justice to Pavlov, point out that he used the conditioned reflex mainly as a means of exploring the perceptions of animals and of finding out what they can see and hear. His method consisted in conditioning a dog to dribble at the sound of a bell in the key of A, and then sounding a bell in the key of C. If it dribbled at the new sound this would suggest that the dog noticed no difference between the two bells. If it failed to do so, however, it would be obvious that the dog could discriminate between the two different keys. By means of this method Pavlov found out that dogs' ears can pick up sounds that humans cannot hear. He also found out that dogs are colour blind.

The Significance of Conditioning

It is important to be clear about what actually happens during the conditioning process. We start with an already-established pattern of reactions, such as a dog salivating at the sight of food, flinching when hurt, or snuggling against anything warm and comforting. All these reactions follow automatically on particular stimuli, such as the sight of food, pain, or a warm fire. What is to be learned is presented in close association with the original stimulus until it is so linked up *with it that the response follows automatically, even when the original stimulus is withdrawn.*

This could be shown diagrammatically as follows—

Original Stimulus (The pain of a blow)	→	*Original Response* (Flinching or crying)

This is automatic and inevitable. When, however, pain has been inflicted several times by means of a whip the situation will be as follows—

New Stimulus (Seizing of a whip) Associated with *Original Stimulus* (The pain of a blow)	→	*Original Response* calling forth (Flinching or crying)

When the conditioning is fully established the diagram could be simplified into the following—

New Stimulus (Seizing the whip)	→	*Original Response* (Flinching or crying)

As time goes on the animal may come to associate certain tones of voice or even certain words with the seizing of the whip, and it may show signs of apprehension when it hears these. This is a case of even more remote conditioning from the original stimulus.

Most animal training depends to a great extent on the conditioning process, the right response on the animal's part being associated with rewards, and the wrong responses with the fear of punishment. By degrees more and more complex behaviour-patterns can be built up in this way until the turns produced at the circus are finally perfected. Whatever one may think of these aesthetically, it is interesting to see how the trainers never run any risk of the conditioning breaking down. Each successful trick is rewarded by a suitable titbit, while every time an animal fails it is made to try again and is threatened by gestures or whip-cracking until it achieves the desired performance.

Conditioning in Human Learning

In early life a great deal of human learning is probably a matter of conditioning. The baby left alone in a room with an electric fire may crawl towards it in order to play with this pretty brightly-glowing object. If it succeeds it will burn itself more or less severely and from that moment onwards it will distrust brightly-glowing objects in general and electric fires in particular, having associated them with the pain suffered from the original burn.

In the same way its mother represents a source of infinite reassurance and comfort to a small baby, but soon it will appear that certain types of behaviour may cause even the mother to stop being comforting and reassuring. The baby learns to avoid these so far as it can understand and control them. During the first few years of life learning may be largely a matter of sorting out "things that have pleasant results" from "things that have unpleasant results," with moments of frightening bewilderment when behaviour which was expected to have pleasant results unaccountably turns out to have unpleasant results.

Many of our attitudes grow out of this learning process, and many uncritical people will approve of things simply because their early conditioning has taught them to do so. Perhaps we should not over-emphasize the importance of conditioning in human learning, even among small children, because there are other methods, but at least the conditioning process does bring to light one aspect of learning which we cannot overlook, that of motivation.

No one will ever learn anything unless he sees good reason for doing so, and the stronger the reason for learning the quicker and more efficient will the learning process be. Dogs pay little attention to electric bells until they begin to associate them with food. Then they will learn to distinguish between one and another without difficulty. Children have no interest in personal cleanliness until dirty hands become associated with disagreeable consequences. Then they will learn to take some care of their appearance in order to avoid the unpleasantness of a rupture in the good relations with their parents.

THE DEVELOPMENT OF SKILLS

It may take a little time to establish a conditioned response in an animal, and in the same way it may take some time for a human being to develop a particular skill. Practice or repetition frequently bulks large in the learning process.

This is most clearly seen in the development of some manual skill, such as playing scales on a piano. At first the fingers are clumsy and ill-controlled, the notes are struck unevenly and with differing weight, and the scales are jerky and inaccurate. Gradually, however, control develops and the notes are struck more accurately, the scale becoming smoother and more rhythmic in consequence. The improvement is gradual and continuous, and leaving out the question of learning scales of different keys, it depends entirely on practice.

Any activity which depends on the formation of muscular habits, therefore, such as the playing of a musical instrument, is largely a matter of repetition. One would expect improvement to be directly associated with practice in the sense that every trial was a little better than the one before it. Shown diagrammatically this would mean the following learning curve—

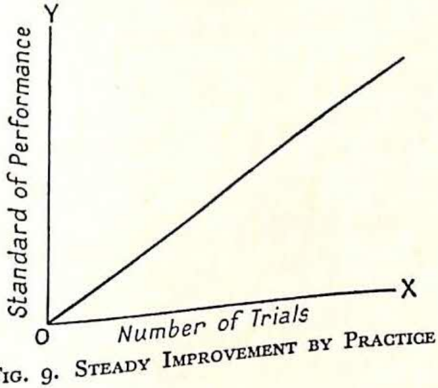

FIG. 9. STEADY IMPROVEMENT BY PRACTICE

If it were possible to find a learning situation which depended solely on the acquisition of simple manual skills, such a curve might be found.

LEARNING BY INSIGHT

There is, however, another kind of learning which is of great significance in human affairs. This is learning to understand things, a purely intellectual or "ideational" process, which might occur when one is presented with a railway time-table, and asked to find out from the mass of figures and letters the next train for, say, Manchester.

Now the first time we may have to do this it may take us quite a time before we can sort out the connexions between the index and the page numbers, between the stations on the list and the times of the trains. But having got all this clear, the second time we consult a time-table it may take us no time at all to find what we want. The whole thing has become child's play because we have developed enough insight into the time-table to understand how to use it.

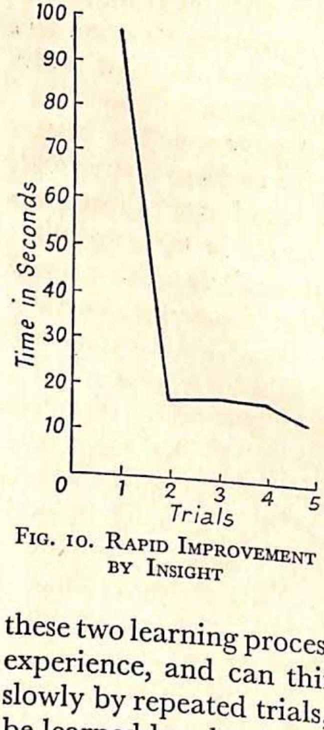

Fig. 10. Rapid Improvement by Insight

Now in a situation which depends entirely on insight, our first trial may take quite a long time, but our second will take no time at all. Our third trial may be only a little better than our second because we may already have reached nearly the limit for that kind of performance. In this case our learning curve will look quite different, showing a quick improvement after the first trial, but very little after the second.

Most people can probably identify these two learning processes, practice and insight, from their own experience, and can think of situations where skill is built up slowly by repeated trials, and also of situations where what is to be learned breaks upon one "in a flash." If we could find cases of pure practice learning and pure insight learning we should probably have the two characteristic curves in an extreme form.

MIXED LEARNING SITUATIONS

In ordinary life, however, we do not find learning situations which depend solely on practice or solely on insight. There may be a bias in one direction or another, but most of them are mixed, practice accounting for a certain amount of steady improvement with insight developing every now and then to produce a sudden leap to a higher standard of performance.

This is borne out, for example, in the ordinary person's experience of learning to ride a bicycle.

At the start one has to learn a number of things at the same time. The pedals must be driven by one's feet smoothly and with the right amount of pressure on each alternate downstroke. One learns to balance by leaning from one side to another to compensate for the varying distribution of weight, and by turning in one direction or another to avoid falling off as the machine wobbles. At the same time one must steer the machine in the direction one wishes to go, put the brakes on when one wishes to slow down, pedal harder uphill or to increase speed, and so on. It is difficult to keep all these things in mind at the same time and so we start off on a level surface with a friend to hold us upright while we master one set of muscular movements, such as pedalling. Practice will soon bring this under control and as the muscular habits develop we can turn our attention to steering the machine and keeping our balance. All the time insights will be developing about the relation of our speed and balance, and of the effect of balance on steering.

As we go on the various muscular movements will form into habit-patterns and will cease to require much of our attention to keep them going. Once the pedalling movements have integrated into a muscular habit-pattern they will drop out of sight, so to speak, and the same will happen to the movements involved in steering, balancing, and so on. More integrations are formed, more insights develop and gradually the whole complex of skills involved in riding a bicycle is built up.

Improvement in such a case will go in fits and starts. There will be periods where little is noticeable and when one is, in fact, wrestling with the pedals and trying to make them go round smoothly. There will also be periods of very rapid improvement, when one discovers that by getting up enough speed one can keep one's balance without difficulty. Practice will indeed make perfect, but there will always be flashes by which we improve more in ten minutes than we have done in the previous week's steady application.

THE TYPICAL LEARNING CURVE

This process can be shown in the form of a learning curve. A graph is laid out with the number of trials along the X axis and some measurement of performance on the Y axis. It may call for a certain amount of ingenuity to devise an objective criterion of performance. Where the time taken gives an adequate measure, improvement will be shown by the learning curve dropping until the physiological limit is reached, below which it is impossible for any human being's performance to drop. Where, however, the performance must be evaluated on some other basis such as accuracy or smoothness, then improvement will be shown in larger numbers of marks being awarded and the curve will rise until the limit of performance is reached. But whether the nature of the task compels the curve to have an upwards or a downwards tendency the same characteristic form will be found.

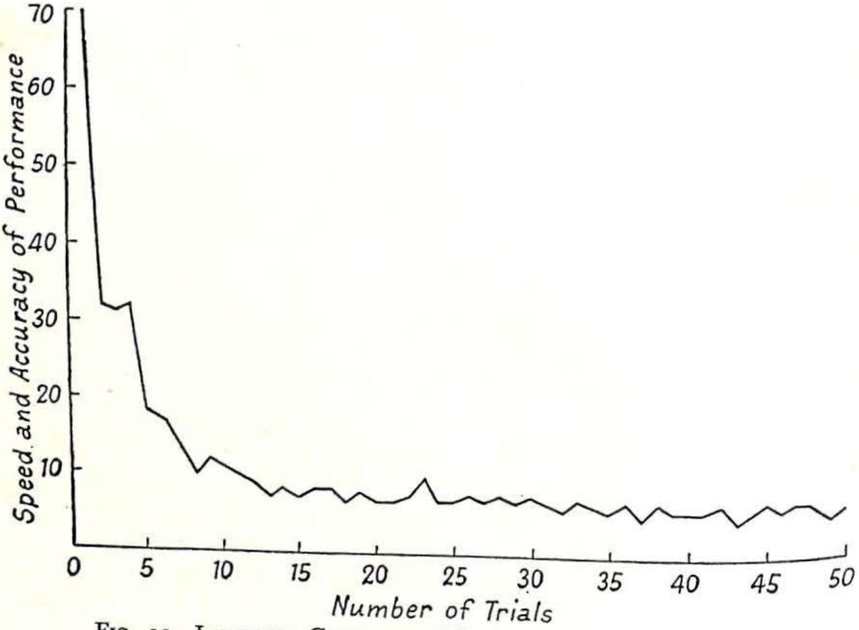

FIG. 11. LEARNING CURVE FOR MIRROR-DRAWING EXPERIMENT

Above, for example, is a typical learning curve, built up on mirror-drawing study in a laboratory.

In this case performance has improved rapidly in the first few trials as insights into the unfamiliar task developed. Then it levelled off while practice in the new muscular habits went on. After a little, new insights appeared and the habit-patterns integrated with a consequent rapid improvement in performance. So the learning process proceeds, with flat periods where little or no improvements take place interspersed with rapid jerks where a new level is reached quite suddenly.

Learning curves can most easily be built up in the laboratory on tasks which can be evaluated easily on an objective basis. In case these should look artificial and unconvincing, however, here is a curve for the learning of morse by telegraph operators over a period of weeks.

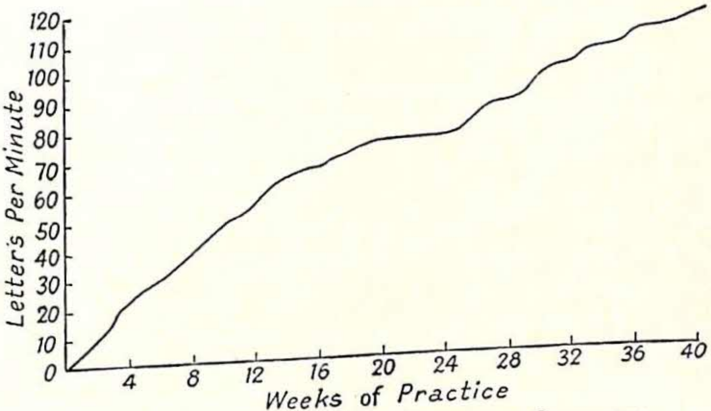

FIG. 12. LEARNING CURVE FOR TELEGRAPH OPERATORS

Here again the characteristic pattern appears.

DIFFERENCES IN SPEED OF LEARNING

The ability to achieve insight into what has to be learned can have an important limiting effect on the learning situation. In some animal-learning studies several years ago, dogs and cats were shut up in boxes which could be opened by pulling a string or moving a lever while food was displayed to them outside. They responded by making random efforts to open the box, shaking the door, pawing the lock and plunging about until by accident their paw happened to catch in the lever and make the movement necessary to open the door. This became known as "trial-and-error" learning and is indeed characteristic of a situation where insight is inadequate to what has to be learned. A second trial showed the same random behaviour except that the necessary movement might be made a little earlier in the proceedings. Further trials would show further improvements until the animal had understood which movement was necessary to open the box and could make it first time by deliberate intention.

Trial-and-error learning was thought to be characteristic of animals in contra-distinction to man who could short-circuit this process by making many of the initial moves in his head. This view, however, was modified when animals came to be studied in circumstances which were a little more natural than puzzle-boxes in a laboratory. It was found, for example, that dogs could achieve insight into certain situations and solve them first time. For example, if a dog were placed in front of a fence behind which was a plate of food, it could find its way round the end of the fence or through a gap some distance along it. There was little or no random trial-and-error in such a situation for the dog could learn by insight how it should be dealt with.

When a hen was confronted with the same situation it was unable to achieve the necessary insight into it. The hen fell back at once on trial-and-error behaviour, flying against the wire and fluttering about in random undirected trials. Various studies have shown that different animals are capable of achieving insight into situations of different levels of complexity, and it seems apparent that they only fall back on trial-and-error learning when their insight is inadequate.

Of the same nature as trial-and-error learning is learning by imitation. Movements can be copied without any real understanding of their purpose and sequence, as when children or certain animals mimic adult activities.

Some things can be learnt fairly effectively by imitation, as they can by trial-and-error, but these processes always have limitations. Only cut-and-dried routines or "drills" can be learned in this way and without real insight into the situation the learner will always be at the mercy of unexpected happenings. There will always be the danger that the "drills" are put into practice in unsuitable circumstances.

DANGERS OF CLASSIFICATION

We have described various different aspects of the learning process and it is to be hoped that the reader will find that most of these, on reflection, strike an answering chord in his own experience. But we must not expect to find that any learning process can be neatly described as involving "conditioning," "practice," "insight," "trial-and-error" or "imitation" alone. Most learning situations will depend on some or all of these processes going on at the same time.

Motivation is fundamental to the learning process so that from this point of view there will always be an aspect which recalls the conditioned response. Learning will only take place when what is learned presents itself as a means of obtaining something we already desire. Likewise practice or repetition comes into most learning situations to a greater or less degree; indeed in many cases when a skill is being learned it is only after a certain amount of practice that some insight can be developed at all. Few of us when learning about mechanical things have escaped the humiliating experience of trying all the adjustments we can think of in the hope that one may prove to be right, thus falling back on the trial-and-error learning when our understanding of the situation is defective. Again many of us have gone through motions that we have seen other people use at one stage or another, thus showing how imitative learning can play its part.

But probably insight is most fundamentally important in human learning. This is what has been called the "Aha-experience," when all of a sudden everything clicks into place in our mind and we see the activity to be learned quite clearly and simply. Such an experience is not confined to ideational learning; it can be equally valid when a manual or muscular skill is approaching perfection and one understands exactly how the tool should be used to get a certain effect or how the arm must be swung to bring off a certain shot.

Probably also this method of learning is characteristic of humans with their greater power of trying things out in their head or going over the situation in symbolic terms (see previous chapter), rather than in actual practice. And certainly many of the things that people must learn in a modern industrial community require the exercise of insight before they can be learned effectively.

So many things have to be included in our consideration of the learning process that the reader may find himself being asked to consider incongruities simultaneously. If, however, he thinks of an ascending scale of learning, from animals with rudimentary minds learning simple routines up to human beings with their highly developed powers of perception and thought learning difficult and complex intellectual tasks, he will find that most of the processes described in this chapter will fit in quite easily somewhere in the picture.

SUMMARY

1. What is the simplest form of learning? How does it work?

Conditioning is the simplest form of the learning process. It takes place when something new is grafted on to an already-existing stimulus-response pattern, such as when a dog is conditioned to salivate at the sound of a bell which is rung at the same time as food is presented.

2. What is the significance of conditioning in animal and human learning?

The training of animals is almost entirely a matter of conditioning, what has to be taught being associated with food or other rewards, while the wrong reactions are associated with punishment or the threat of it. In the earliest years of human life most learning is probably very largely a matter of conditioning.

3. What are the relative parts played by practice and insight in human learning?

The learning of most skills depends largely on practice or repetition which results in the steady but gradual improvement in performance. Learning by insight results in sudden flashes of comprehension which lift the performance at one leap on to a higher level. As most learning situations are mixed the typical learning process shows periods of gradual or even imperceptible improvement through practice, interspersed with rapid improvements when new insights have been achieved.

4. What is a learning curve?

A learning curve is a graph showing the improvements in performance during a learning process. The number of trials or time-scale is laid out on the horizontal axis and the scale of performance on the vertical axis. According to the task to be learned the curve will have different shapes, but in most cases it shows the typical "plateau periods" with periods of sudden improvement.

5. What is trial-and-error learning?

When insight fails, the learner may fall back on random movements, trying everything he can think of until by chance he hits on the right thing to do. This is typical of animal learning whenever the task is beyond the animal's level of insight, but it can also be seen in similar circumstances among human beings. Learning by imitation is also seen when insight fails, the learner copying movements blindly with no comprehension of their purpose or meaning.

CHAPTER VI

MOTIVATION AND EMOTION

In our consideration of human behaviour so far we have confined ourselves mainly to *how* things happen, how the senses work, how we remember, how we learn, and so on. We have not yet paid much attention to *why* things happen, why an individual wants to learn something, why he thinks about this or that, and so on.

Yet without considering the "why's" of behaviour we shall be left with a very one-sided and incomplete understanding of human beings. In particular we shall have no clues as to which course an individual is likely to take, because though we may know something of the workings of his mind we shall know nothing of the direction in which he is moving or the goals towards which he is aiming. Any understanding of these goals or directions must depend on some study of the motives of behaviour.

Let us suppose that a small child were presented with a tray on which were displayed a copy of Plato's *Republic*, the connecting-rod of a motor-car engine, a hank of grey wool, and a chocolate. It is practically certain that the child's attention would be attracted first by the chocolate and that left to itself it would pick it up and eat it. It is also highly probable that the child would make an effort to overcome obstacles in order to get at the chocolate, while it would not do so in order to get at the other objects.

If this be accepted as a likely development of such a situation, then it becomes obvious that there is a bond of attraction between the child and the chocolate. We may look at this from two different angles. On the one hand the chocolate has certain properties which make it an attractive object to the child, while on the other, there is something in the child which makes it want the chocolate and which will cause it to make some effort to take it and eat it. In other words, the chocolate is an attractive object to the child, while the child is motivated towards taking and eating the chocolate.

Thus in our understanding of motivation we can, and indeed we must, approach the subject from two points of view. We can think of the objects, or properties of objects, which attract an individual and we can think of the elements in the individual—desires, wishes, and appetites—which will move him towards various objects.

FUNDAMENTAL HUMAN URGES

In such an obviously complex and intricate field—for all around us people are striving to achieve all sorts of things—our first task must be to try to simplify the issues by getting down to fundamentals. Are there any motives which are sufficiently simple and widely felt that they can be taken to be universal among human beings? In other words, if we take a number of people chosen at random and put them into any situation, is there anything we can be quite certain that they will all do without exception?

There are obviously a few such things that one can be certain of. The desire for food, for example, can be relied on to make itself felt in anyone after about six hours without a meal, and the same will apply to the desire for drink. The same may be said in this climate about a desire to keep warm either by putting clothing on our bodies, or finding warm and sheltered places where we can sit in some protection from the elements. Likewise the desire to sleep will make itself felt in everyone after many hours of activity, while everyone, at one time or another, will feel a desire to associate with other people and at times with the opposite sex.

These simple basic urges—to provide oneself with food and drink, with clothing, rest and shelter, to associate with other people—are universal among human beings because they are necessary to support life. Unless we are conscious of these urges as individuals and are capable of satisfying them we shall starve or freeze to death, and unless as a community we can provide for them we shall cease to exist after a generation or so.

Nor are these urges peculiar to human beings only. Animals also are motivated by them because their survival depends equally on providing for them.

Variations in the Means of Satisfaction

The satisfaction of these urges, however, is not always so simple as in the case of the child with the chocolate. In the long run a great deal of planning and forethought will be required to satisfy them and the motivation, to be effective, must provide also for the means of satisfaction of the basic urges. This, of course, is the point at which variation steps in, because while we can be sure that all animals including humans will desire food we cannot be sure what kind of food they will desire or what means they will use to satisfy that desire.

Among the animals the kind of food desired and the means of procuring it tend to become specialized and fixed, and the behaviour-patterns involved become rigid and unvarying to such an extent that the animal's anatomy becomes modified to make it better adapted for the purpose. Cows have satisfied their hunger by eating grass for so many generations that they have developed mouths and digestive organs which are adapted for that purpose only. Tigers, on the other hand, prefer animal food and their bodies and habits are adapted to the pursuit and slaughter of suitable beasts. Both animals desire food and both can provide themselves with it, but it is as fantastic to think of a cow chasing a goat and eating it as it is to imagine a tiger lying happily in a pasture chewing the cud. Moreover, neither animal would want to.

This rigidity and specialization in the means of satisfying their basic needs is characteristic of animal behaviour and at times it is carried to very remarkable lengths. In the provision of a safe environment in which to bring up their young, for example, some insects go through a complicated series of routines such as digging an underground chamber, leaving a paralysed victim for the family to feed on, or laying eggs which will be eaten and pass through the digestive system of another animal. Weaver-birds, for example, build an extraordinarily delicate and intricate nest of leaves and other materials in which to hatch out their eggs and bring up their young.

None of these behaviour-patterns seems to have been learned by the creatures concerned, for each can set about its particular routine and produce the correct result at the first attempt.

Indeed in some cases it is quite impossible that the creature has even seen the complete series of activities carried out in its entirety. Animals in such cases seem to be acting from some inner urge, quite blindly and automatically, and with no comprehension of the outcome. Their behaviour, however, seems to be quite effective in achieving the particular purpose for which it was designed.

These blind, uncomprehended, but effective motivational patterns are known as *instincts*, and this term should be kept for use in describing animal behaviour. Instinctive behaviour has been defined in the following terms—

(*a*) It is the performance of complex trains of activity which involve the whole organism.

(*b*) These trains are of biological value to the species (i.e. they serve to keep it alive).

(*c*) They are similarly performed by all members of the species.

(*d*) They do not have to be learned, but are performed perfectly, or at least adequately at the first attempt.

HUMAN MOTIVATION

Has motivation of this sort any place in human life? Does a small child, in other words, begin suddenly to provide for any of its basic needs without having been taught? There may be some examples, such as a baby sucking or getting rid of its waste products, but these are very few. The characteristic thing about human life is that so few behaviour-patterns appear ready-made or are performed similarly by many members of the species. Most behaviour-patterns have to be learned and there are very wide differences between different individuals in them.

Think, for example, of the provision of food. The basic drive is common to all the human race, but people eat meat, vegetables, cereals, fish, fruit, and many other comestibles, down to seal blubber and bird's-nest soup. The balance between these products will vary according to the time of year and the part of the world, while each individual will have his own preferences among what is available. At the same time people will eat in different ways, some with knives and forks, some with chopsticks, and some with their fingers. In providing themselves with food also different communities make different arrangements, some taking up hunting and fishing, some raising flocks and herds, some cultivating the soil, and some trading and exchanging.

All these different methods of satisfying the basic urge for food have to be learned by the individual as he grows up in a community. Thus a small child in the Far East will probably be introduced to rice as soon as his digestion can cope with it, and by the time he is adult his ideas about eating will be expressed in a complex series of behaviour-patterns which may begin with ploughing and planting in the paddy fields and end with a bowl and a pair of chopsticks with some bits of highly spiced fish and vegetables to give some relief to the bulk of the main dish. A western child, on the other hand, will develop an appetite for a whole range of foods, will eat them in a different manner and will think of procuring them in shops and markets for money which he has earned by engaging in quite different activities.

Motivational Patterns

What seems to be characteristic of human motivation, then, is that while the basic urges necessary to sustain life remain the same, the means of satisfying them are extremely variable, and have to be learned as the individual develops. This presents quite a different picture from animal motivation because the influence of the community and the individual will make itself more widely felt.

It also makes human motivation very difficult to explain except in the most general terms. We may start with a number of simple drives necessary to maintain life, such as hunger and thirst, a drive towards self-protection which makes us seek warmth and shelter, and a drive towards self-assertion which makes us try to make some impression on our environment. To these we may add simple drives necessary for the continuance of the community such as the sex impulse and an urge to be among other people. Everyone would probably admit that the basic motivational pattern of human beings and of many of the higher animals is something like that, any disagreements being mainly confined to matters of nomenclature.

As soon as we begin to think of the motivation of a particular individual, however, the trouble begins. It is of little interest or value to say that he will feel these basic simple urges; what we want to know is his motivation at this particular moment in terms of the directions and goals he sets himself and the objects which will have an attraction for him. Such a problem will be a highly individual one because it will depend on the following matters—

(*a*) The natural environment which will make certain things possible. A tropical islander will not seek fur from polar bears.

(*b*) The culture-pattern which will have provided certain means of satisfying basic urges and taught him to like them.

(*c*) The immediate social group which will hold out certain values and discourage others.

(*d*) His own pattern of abilities which will make certain things easy of attainment.

(*e*) Habit which will cause him to repeat certain behaviour-patterns.

Basic Needs and Culturally-determined Methods of Satisfaction

Can we provide ourselves with a simple framework for the understanding of human motivation? This will run us into the dangers of over-simplification but it is nevertheless necessary if we are to grasp this fundamental problem in psychology. Bearing in mind the essentially complex nature of the issue and making every allowance for individual variations, we might lay down the following categories for the classification of basic human needs. These are—

MATERIAL NEEDS, or everything necessary to maintain our bodies in health, such as food, shelter, means of keeping warm and dry and so on. These are obvious and straightforward, for if we fail to supply them we shall cease to exist, while if we only succeed in partially supplying them, if our diet is inadequate and if we are not properly protected, we shall suffer from deficiency diseases or the other unfortunate accompaniments of a low standard of living.

COMPANIONSHIP NEEDS, or everything associated with living with other people and interacting with them. If the individual does not succeed in satisfying this need, he will feel lonely and unhappy; in the longer term also, this need is important for the survival of the species. If we do not live together, we shall not have families, and if we do not have families, the human race will die out. Moreover, the family is an essential unit in providing children with the protection and affection which is essential to their development in the early stages of life. This heading, therefore, covers needs which are of fundamental biological importance even though they may not be so immediately obvious as the material needs outlined above.

EGO NEEDS, or everything associated with being an individual as distinct from other individuals. This is quite as fundamental and universal as the other two categories and it can be taken to cover all that the individual does to have some impact on his environment, every attempt to set higher standards for himself, every refusal to be submerged in the mass. Again, if the individual feels that he does not matter or that nobody cares about him as a person, he will feel unhappy and deprived, while in extreme cases he may become pathologically depressed or even run the risk of suicide.

Accepting these three categories for what they are worth, as a means of classifying basic human needs, we should turn our attention mainly to the means of satisfaction. As a generalization we could say that every activity which the individual sets about is undertaken because it appears to him a means of satisfying one or more of these needs. Similarly, every institution in a community owes its continued existence to the fact that it is seen by the members of that community as a satisfaction-pattern. But the way of life of different individuals and communities is so varied that we must make some effort to understand how these needs are being satisfied. The primitive agricultural village with its rather inefficient cultivation of the surrounding soil will provide a low standard of material satisfaction, but the intimate contact with other members of a small social unit may provide a much higher standard of satisfaction for the companionship needs. Similarly, it is not difficult to be a person in a small unit, to satisfy one's ego needs by knowing that one counts for something as an individual and is recognized by other people for one's skills, one's knowledge or one's personal worth. The modern industrial way of life, on the other hand, offers a much higher material standard of satisfaction through its vastly more complex and efficient economic system, but whether it offers the same companionship and ego satisfactions to the ordinary person is a matter for conjecture. A big city can be a very lonely place and the individual can be a very small and insignificant unit in it. Whether the ordinary person has the same overall degree of satisfaction in an industrial city with its high standard of living as he had in the village with its closer companionship and greater opportunities for being known as an individual is a question worth pondering.

EMOTION

The detached study of human behaviour always risks giving the impression that individuals move about like specimens under a microscope, with this or that characteristic, learning things according to a predetermined method and speed, and moving towards predictable goals in a manner which can always be foreseen. There is something inhuman about it all, something mechanical and predictable which is remarkably uncharacteristic of human life. Something is missing which ought to be taken into consideration if we are to get a true picture of human behaviour. What is it?

In the language of everyday life, we have paid no attention to a person's "feelings." We have allowed no place for that which always accompanies every one of an individual's activities, we have forgotten that whatever he may be doing he will have some feelings about it. It is to this "feeling-tone" if we may call it that, that we must now turn our attention. What do we know about it?

Apart from the fact that some feeling-tone accompanies all our waking and some of our sleeping experiences, we may say in the first place that it has a varying quality. At times it may be pleasant or even very pleasant; at other times it may be unpleasant or acutely so. Then again it may be neither noticeably pleasant or unpleasant, but rather neutral in quality.

We can, of course, establish this fact by observation of ourselves or other people. At any one moment we may think of our feelings and decide whether they are pleasant, unpleasant or neutral, or we may look at another person and make a fairly accurate guess at the state of his emotions by observing his facial appearance, gestures, or voice.

We can also decide, in general terms, the kind of things which will cause a pleasant feeling-tone, and which an unpleasant one. The right degree of fatigue, an armchair by the fire and agreeable companionship usually result in the former, while physical discomfort or the threat of it in the latter.

The Accompaniments of Emotion

As has been mentioned above, feelings are accompanied by characteristic gestures and behaviour. When we see someone smiling quietly to himself, whose posture is upright with head held high and chest out, we can say with some certainty that his feelings are pleasant. If a child breaks out into fits of laughter and hops and skips and dances, we suppose that its feelings are acutely pleasant. But if we meet someone whose posture has slumped, whose head is bowed and whose shoulders droop, who says little and whose mouth and facial expression have a downward tendency, we can be pretty sure that his feelings are unpleasant. If a child, whose emotions are usually more vivid than those of an adult, breaks down into tears and moans we shall say that its feelings are acutely unpleasant.

All this is a matter of common observation, for such expressions and gestures can be seen among our friends and acquaintances in the course of our daily life. But there are other physical accompaniments of emotion which cannot be seen by ordinary observation because they are concerned with the internal organs of the body. Strong emotion will cause changes in the rate of breathing and also in the pulse rate and blood pressure. These can be measured by the appropriate instruments. Rather curiously, emotion will also cause changes in the electrical resistance of the skin, due to the sweat glands coming into action. These changes can be measured by passing a small current through a portion of the skin and linking it up with a galvanometer. The so-called "lie-detector" depends on instruments like these, for it is simply a means of studying emotional reactions which are not visible to ordinary observation or subject to conscious control.

There are other accompaniments of emotion which depend on rather intricate parts of the nervous system which link up with the "ductless glands." When these glands are stimulated they discharge fluids into the blood stream which cause the digestive processes to be interrupted, counteract fatigue in the muscles, and open wide the air passages in the lungs. All these changes would enable the individual to fight or run away more effectively if he were to be attacked. In ordinary life, however, emotion-provoking situations can seldom be solved by such actions and consequently these changes in the body serve only to interfere with its normal functioning. This is the reason why emotional strain is linked up with various kinds of ill-health such as stomach and digestive ailments—the "psychosomatic" complaints.

What Causes Emotion?

A small baby will show emotions in a very simple and easily understood form; its range of emotion will be from pleasant on the one hand, through a neutral state to unpleasant on the other. There will be little more differentiation than this, the emotions being simply a matter of general excitation of feeling. There will be happy feelings, there will be unhappy feelings, or there will be no feelings at all. Beyond this, the emotional life will have no further complications.

The causes of these feelings will be equally straightforward and will in most cases be concerned with the baby's physical comfort or discomfort. When it is warm and well-fed it will be happy and when it is cold, hungry or in pain it will be unhappy.

As we grow up, however, our emotional life becomes more complex. The kinds of situation which arouse emotions increase and become rather more subtle. Pleasant emotions no longer depend on physical well-being alone, but can be aroused by the approbation of our fellows, the successful execution of something we have planned for some time, or the carrying out of some intricate activity at which we are particularly good. Unpleasant emotions can be called out, not only by actual physical discomfort but by the threat of it, by losing the good opinion of one's associates or by the inability to comprehend a situation or to manipulate it in the way one wants. Particular individuals will react differently to the same situation, one experiencing pleasant emotions from it, another remaining quite neutral, while a third experiences unpleasant emotions from it.

What Different Emotions are There?

As the situations which provoke emotion develop and become more complex, do the emotions we experience become differentiated into various types? In other words is the simple "happy—neutral—unhappy" pattern of the baby replaced by a number of different "happy" emotions, such as "pleasure," "excitement," "satisfaction," and so on, and a number of different "unhappy" emotions such as "fear," "anger," "hatred," "frustration," and the like?

This is a very difficult question to answer. In ordinary speech we have a large number of words indicating different emotional states and it is generally accepted that, say, "fear" and "rage" are quite distinct and separate. When these come to be studied in the laboratory, however, it has proved impossible to lay down such a clear distinction between them. The behaviour-patterns which give them expression can easily be confused so that when one is presented with a series of records of an individual's behaviour including those of his breathing, pulse rate, and other internal changes, it is possible to say "This person has been suffering from a strong unpleasant emotion," but not to define that emotion as "fear," "anger," "hatred," or anything else, without knowing what caused it.

In the same way the gestures with which we express our emotions depend on the manners of the people we live among. In this country, clapping the hands would generally be interpreted quite correctly as a sign of pleasant emotions, but in China it is a sign of worry or disappointment. Likewise in some families the means of expressing anger is to stamp and shout, whereas in others it is rather to become silent and icily courteous in what few words have to be said.

Attempts to differentiate emotions, therefore, have proved unsatisfactory, and it is difficult to be certain that we have a number of separate ones, each labelled neatly "fear," "love," "horror," and so on. Yet obviously there *are* differences between our emotions, otherwise these different words would not have appeared in the language, nor would they convey a meaning from one person to another. How then can we sum the situation up?

Conclusion

We may begin by saying that every experience in life is accompanied by some kind of feeling, or by an awareness that it is happening. In many cases, this feeling will be quite unremarkable and approximately neutral in tone. In such cases we may say that the experience will have aroused no emotion.

In other cases, however, the experience will arouse an emotion, the feeling or awareness which accompanies it being sufficiently strong to draw attention to itself and to have a very definite tone. Such emotions will be accompanied by gestures or expressions which can be seen by other people, and also by changes in the digestive processes, pulse rate, etc., which cannot be seen.

The kinds of experience which call forth emotion will vary with the individual according to the kind of people he has lived among, his own aims, values and ambition, and his own stage of emotional maturity and control. In general, however, emotion will probably be aroused by experiences which threaten or enhance his integrity.

The kinds of emotion we feel can be subdivided broadly into pleasant and unpleasant (those feelings which are merely neutral we shall not consider as emotions). According to the kind of experience which has called them out we may further subdivide them as, for example, a pleasant feeling following close association with an individual to whom we are attracted would be called love or affection, while a similar feeling following the recognition of our achievements by people we respect might be called gratification. Similarly an unpleasant feeling accompanying a threat of physical harm against which we cannot fully protect ourselves might be called fear, while a similar feeling following the discovery of something we had done which was considered unworthy by those we respect might be called shame.

These subdivisions of the pleasant and unpleasant emotions, however, do not appear to have their own characteristic and distinct behaviour-patterns, and it seems very doubtful whether they can be distinguished one from the other except in terms of the experiences which call them forth.

SUMMARY

1. What do we mean by motivation?

We are concerned here with what causes one individual to direct his efforts in any particular direction. We may consider it from two points of view—

(*a*) The external objects which have an attraction to him.
(*b*) The inward urges which move him in different directions.

2. Is there any common element in motivation?

Basically all human beings and many animals are affected by a few simple fundamental urges which they must satisfy if they are to sustain life. These are food, drink, clothing and shelter, companionship, and the like.

3. What are the characteristics of animal motivation?

Rigidity and specialization seem to be typical of animals in this direction. So much so that highly complex trains of activity emerge in the behaviour of all members of the species, which keep them alive and which seem to be performed adequately at the first trial without being learned.

4. Has this type of instinct any place in human motivation?

Very little. What seems to be characteristic of human motivation is its flexibility in devising means to reach its end, its need to be learned, and its subjection to individual variations.

5. What causes the variations in human motivational patterns?

Such things as the natural environment which makes certain things available; the culture-pattern which leads to certain things being generally accepted; the immediate social group, its attitudes and values; the individual's abilities and habits.

6. What do we mean by emotion?

Emotion is the feeling-tone which accompanies almost all of our activities. It ranges from acutely pleasant, through a neutral zone, to acutely unpleasant, though probably the neutral zone should not accurately be called emotion.

7. What are the accompaniments of emotion?

There are overt signs and gestures such as smiling, crying, clapping the hands or adopting a drooping posture. There are also internal changes in blood pressure, breathing rate, sweating, or in the discharges of ductless glands. These latter cannot be consciously controlled.

8. What causes emotion?

Basically, pleasant happenings cause pleasant emotions and unpleasant happenings cause unpleasant emotions. In childhood the emotional life is simple and is concerned largely with bodily well-being. In adult life the emotional life becomes more varied in consequence of the more varied social existence we lead.

9. Is it possible to differentiate between different emotions such as fear, anger, and the like?

Emotions can be classified broadly as pleasant and unpleasant, for the bodily changes accompanying these are quite clear and distinct. Beyond this, however, it is perhaps impossible to classify emotions except in terms of the situations which have called them out.

CHAPTER VII

GENERAL PSYCHOLOGY AND PSYCHIATRY

PSYCHOLOGY is the study of normal human behaviour, and the main aspects have been touched on in the preceding chapters. It has a physiological side, for much depends on an adequate knowledge of how our bodies work, of the nervous systems which bring information from the sense-organs and which initiate the movements of our muscles, and of the more abstruse reaction systems which control the internal secretions and other processes which accompany various states of feeling and activity. It is concerned with cognition, which is the name given to all the processes which begin with the sensations from the outside world, their perception, comprehension, and the memory of them. It is concerned also with learning and with the development of skill, while it also has a dynamic side in its preoccupation with the motivation of behaviour and the feelings and emotions which accompany it.

THE METHODS OF PSYCHOLOGY

Originally, these matters were studied mainly through men paying attention to their own experience, reflecting on it and trying to give a connected account of what went on in their own minds. This method is called introspection, or the observation of one's own experience, and it must always occupy an important place in psychology. There are, however, obvious difficulties in its application partly because each individual's experience is very private and personal to himself and partly because as soon as we begin to study our own experience we find that it becomes very elusive and difficult to grasp.

To make up for the deficiencies of introspection other methods were brought into use by experimental psychologists. Some of these were aimed at giving greater precision to introspective data, such as by asking an individual to decide which of two lights was the brighter, then narrowing the difference in intensity until it was clear from his confused responses that he was unable to distinguish between them, and some were aimed at substituting actual behaviour for them. If one were studying memory, for example, it was obviously more satisfactory to give the person being studied a list of words to remember and to ask him to write down the number he recalled after various intervals than merely to ask him whether he thought it was easier to recall meaningful words than syllables which didn't make sense.

As the science progressed knowledge was accumulated about what happened under various conditions, and theories began to be put forward as to the underlying laws. When these theories were formulated they had to be tested against the facts and this made it necessary to devise crucial situations which would show whether or not they were correct. These situations were known as experiments and were set up so that all the factors were under control, to eliminate chance influences. One factor could then be varied at a time and the results noted.

As an example of the experimental methods in psychology we might think of Weber's work on the perception of differences in intensity. If, for example, someone were shown into a room illuminated by one candle and another candle were lighted, even without seeing the actual candles he would perceive that there had been an increase in the brightness of the light. But if someone were in a room illuminated by five hundred candles and another one were added the increase in brightness would not be noticeable. Why was the addition of one candle enough to produce a perceptible increase in the intensity of the illumination in one case and not the other?

Weber worked on this problem by exposing people to lights of a calculated brightness and then increasing them to the point where the individual just noticed the difference. At different brightnesses he found that a different amount had to be added before it was noticeable; but when he calculated the amount added as a fraction of the original brightness he found that the ratio was constant. In other words, no matter how bright a light may be, if one-hundredth extra brightness is added to it the difference will be just perceptible.

In this way Weber's Law, which holds for perceptible differences in brightness, loudness, temperature, smells, and other sensations was established. Briefly expressed, this states that one stimulus will be noticeably different in intensity from another stimulus in the same sensory mode only if the ratio of the difference to the original stimulus is greater than a known constant. Since this law was first established, however, considerable differences between individuals' reactions have been noticed, and the law has been found not to apply uniformly throughout the whole range of intensities.

It was always possible, however, that such situations set up in the laboratory and carefully controlled might be so divorced from the circumstances of real life that their results would be meaningless. To guard against the influence of these artificialities, field observations were carried out where a situation could be studied under real-life conditions. In such cases it would obviously be impossible to control all the factors which might influence the individual, but at the same time one would see more natural behaviour without the constraints of the cut-and-dried laboratory situation. A judicious alternation of introspection, laboratory experiment, and field studies probably leads to the quickest and most effective expansion of knowledge.

PSYCHIATRY

In addition to the large mass of normal people, however, there is a minority whose behaviour is abnormal and who must be regarded as suffering from some form of mental illness or handicap. The study and treatment of these abnormal people is the subject-matter of psychiatry or, as it used to be called, medical psychology. In former times those who were in any way abnormal mentally were classified as "mad" or "insane" and were locked up and either neglected and left to themselves, or treated with considerable cruelty in order to drive out the evil spirits which were supposed to possess them. The ratio of cures was usually low.

Recent and more imaginative treatment, however, has led to a better understanding of mental illness and it now becomes possible to separate those who are suffering no more than a temporary maladjustment from those who are utterly and incurably unfitted for ordinary life and who need to be looked after for their own protection and that of others.

Among the latter type of case we may note two briefly. The first of these is the mental defective whose powers of comprehension are so limited that he cannot deal with the ordinary affairs of life and who remains for most of his life at the intellectual level of a child of three or four years old. This kind of person has to be given a simplified life for his own protection and is normally put in an institution or educated at a special school where everything is taken very slowly and simply.

The second type is the person who is suffering from severe delusions or hallucinations. This is the conventional idea of "madness," when the individual exists in a world of his own believing either that he is the Emperor Napoleon or that he is made of glass and mustn't risk getting broken. Such cases are very tragic, the more so because frequently nothing can be done with them; but along with the very low mental defectives they are comparatively rare.

Apart from these serious disturbances of personality, however, there are a number of manifestations of mental ill-health of a temporary and less grave character. Prolonged emotional strain or fatigue can result in symptoms of mental disturbance or even of complete breakdown, without it being necessary for the sufferer to spend the rest of his life in a lunatic asylum. In some of these cases rest and relaxation will often effect a cure by themselves, while in others treatment by a psychiatrist will bring the patient back to normal.

Neurosis and Conflict

Perhaps the most frequent cause of neurosis, as these curable maladjustments may be loosely called, is conflict between two opposing impulses. Such conflicts are not infrequent; indeed they are the normal currency of life. For example, we would all like to save money, though at the same time we like to smoke cigarettes. Quite often, therefore, when we fork out our four-and-twopence we are conscious of two impulses, one saying "This is a ridiculous price, you really can't afford it, you know," while the other cries "You must have enough cigarettes in your pocket, for if you run short you'll be miserable, nervy, and you won't be able to stop thinking about smoking." We solve the conflict by telling one or other of the two voices to keep quiet—usually the one which says we can't afford it.

But in some cases the conflict is more serious and we find it impossible to resolve on the spur of the moment because the two impulses are more deep-seated and the issue is of greater real importance. We may continue with both somewhere present in our consciousness for some time. Such a state of affairs may impose a serious strain and will certainly make our behaviour less effective. In some experiments with animals conflicts have been produced artificially. They were trained, for example, to expect to find food behind a trap door of one colour and to anticipate an electric shock if they approached another. Once this conditioning had been well established, the colours were changed and the animals were put into a state of conflict between their desire to get at the food they had been trained to expect and their distrust of the changed situation in which unexpected electric shocks were somewhere in store for them.

Their reactions to such a conflict were most extraordinary. Some would sulk and refuse to try, ending up, when forced, in a kind of sleep-like trance from which they could not be roused for some time. Others became hysterical—whining, struggling, and refusing to eat. Others again ran in circles about the floor with great rapidity, varying this with convulsive hopping and twitching and finally allowing themselves to be rolled into balls or moulded this way and that without showing any more resistance than if they were pieces of clay. Obviously, therefore, severe conflict can result in serious behaviour disturbances, while milder conflicts often result in such hesitation and oscillation between two impulses that neither is adequately dealt with. If an animal is presented with a plate of food while at the same time a hostile animal is produced, the first one will hesitate between the food and the enemy, making ineffective attempts to eat and ineffective attempts to drive the intruder away and so doing neither job properly.

Methods of Dealing with Conflict

Conflict is unavoidable in human life, for the satisfaction of our basic needs (see Chapter VI) is always in danger of bringing us up against the needs and wishes of other people. There is therefore a continual need for adjustment, and we have frequently to say to ourselves "I would like to do so-and-so very much, but if I went straight at it I should be most unpopular with the people about me, and might even get involved in behaviour that I would be very much ashamed of. I'd better give up the idea, or try to find some way of doing what I want that other people will not take exception to." Most of us can manage to make these adjustments for a large part of the time by taking a reasonably objective view of our own desires, the convenience of other people, and the type of behaviour which is considered acceptable by the people we live among.

A process called *sublimation* frequently helps in this, for by its means the energy behind an urge which would lead to unacceptable behaviour is, so to speak, drained off into more acceptable channels. A man who has great ambition to dominate others and to be recognized as an outstanding figure among them may, if he puts the energy behind this drive into artistic or literary activity, achieve his end of being recognized and at the same time contribute creatively to the community in which he lives.

But there are some cases where an individual cannot achieve any reconciliation between his conflicting impulses, with the result that they continue to exist side by side at the same time. This results in what is called *dissociation*, or the splitting off of a system of ideas into a sort of water-tight compartment in the personality. In some cases this may cause the patient to go into a "trance" in which he carries on a sequence of activities which bear no relation whatever to his normal life. The most frequently quoted case of this concerns a patient of Dr. Janet's who was unable to make an adjustment between her sorrow at her mother's death after a particularly distressing illness, and the need to continue her normal life. She would go on as usual for a period with no reference whatever to the tragic event, giving an impression of complete callousness to it; from time to time, however, she passed into a trance-like state in which she went through the scenes of her mother's death with the most intense emotion.

Apart from some cases like these, however, many quite normal people allow conflicting impulses which they cannot reconcile to exist side by side. Desires to do as well as we can for ourselves often cause us to do things of which other people might disapprove and consequently they come up against our desire to stand well with our fellow men. When this conflict is forced on our attention we show the greatest ingenuity in explaining it away to our complete satisfaction. This process is called *rationalization*, or finding reasons for the apparent discrepancy, and can perhaps be seen at its best when a fox-hunting man is endeavouring to reconcile the satisfaction he gains from this exciting sport with the suspicion that it is more than a little cruel and not quite up to the standards of kindness to animals to which he endeavours to live up in other ways. He is generally quite sincerely successful in showing that the danger to the fox is infinitesimal as compared with the thrill it derives from the chase, and, in fact, that the fox really enjoys being hunted as much as the field enjoys hunting him.

In other cases, however, conflicting impulses cannot exist side by side and one or other has to be *repressed*. This happens when we refuse to admit the existence of a disturbing impulse and thrust it down out of sight in the hope that it will disappear. It is a harmful process, for the impulses do not disappear, and it is quite different from the conscious suppression which follows a rational adjustment to conflict. When we feel like calling attention to ourselves at a party by rather too hearty behaviour but restrain ourselves because our host and hostess are rather quiet retiring people, we do ourselves no harm at all though we may have a less enjoyable evening than we had hoped. But when we find ourselves taking an interest in young women and get so shocked at the idea that we might be finding them sexually desirable that we disown the very possibility of our having any sexual feelings at all, we can pile up a great deal of trouble for ourselves.

When we repress such an impulse because it conflicts with our idea of delicacy or with the standards we have been brought up to accept we set up a barrier against its normal expression in consciousness. This barrier will usually take the form of an exaggerated distaste for anything which has the remotest connexion with the repressed impulse. But the impulse will find ways round this barrier and will show itself in consciousness in a disguised and sometimes rather unpleasant form. The ridiculous prudery attaching to anything which might be remotely suggestive of the reproductive organs, combined with a morbid interest in the hunting out of "vice" and the degradation of those whose conduct has been irregular in this respect, is a common enough example of the process of repression and its results.

Phantasy

The continued need for adjustment in our mental life imposes a considerable strain on everyone, and the individual's capacity for enduring this strain varies. Some people can adjust to the most trying conditions without any outward difficulty, while others show the various symptoms touched on above to such an extent that they become mentally ill and have to be treated in hospitals. There are, however, ways of escape which may have a limited effectiveness.

One of these is to retire into a day-dream and to find there the satisfactions which ordinary life denies. Everybody indulges in phantasy to some extent and real life might become too discouraging for words if we could not sail off into unknown seas as the captain of an imaginary ship, dine at the best restaurant in town with the lady of our day-dream, or show the boss, in a phantasy conversation, that we are not to be trifled with.

When the return to real life becomes too difficult, however, there is a danger that we are finding an unhealthy amount of satisfaction in our day-dreams and are using them as a retreat from the realities of ordinary life. It is still more dangerous when we begin to use alcohol to assist our day-dreams and blur the edges of reality. Very frequently the drunkard is one who cannot cope with the adjustments which real life calls on him to make, and who retires into his private world where, accompanied by a few kindred spirits, he can achieve effortless satisfaction.

In the same category is the individual who develops some crippling symptom which makes it impossible for him to stand up to ordinary life. This is known as "conversion hysteria" and may appear as paralysis of the limbs, asthma, digestive disorders and other complaints of nervous origin.

Anxiety

Much of the strain involved in these continual adjustments will make itself felt as anxiety, a great deal of which is entirely normal and universal. Paying our bills, making do on our salary, passing examinations, the disastrous results of illness, keeping our jobs—at one time or another these are everyone's problems and everyone gets worried about them. As we succeed in coping with the situation, however, so do the anxieties disappear and in such cases no one is seriously the worse. Worry of this type, though unpleasant at the time, leaves no permanent after-effects.

But there are forms of anxiety which are much more serious and which do not disappear with the cause. These are usually due not to what is going on in the real world around us, but to something unacknowledged or repressed in our own minds. For example, someone who has set very high standards for himself, or who has had them imposed on him in childhood, may be constantly worried that he may not be living up to them. Moreover, his anxiety will probably have rather a guilty tinge about it, made all the more real because he does not acknowledge it to himself. Anxiety of this type will find its outlet in all sorts of individual ways.

Roughly speaking, so long as one is anxious *about* something, and if that something is sufficiently serious that it might have grave effects on our well-being, then the anxiety is quite normal and need cause no fears about mental ill-health. But as soon as the anxiety becomes generalized and out of proportion in duration and depth to its apparent cause, such as, for example, when "bomb-happy" people continued to be paralysed with fear even after their removal to a safe area, then it is a symptom of some more serious and deep-seated failure in adjustment.

Human life involves a continual series of adjustments between what we would like to do and what we can do; between what other people expect of us and what we expect of ourselves; and between our own powers and resources and the pressures of the external environment. Each one of us has a breaking point and the toughest can be reduced to pulp after a long period of hardship, fatigue, and discouragement. Some unfortunate people have such limited powers of adjustment that their breaking point is reached after the comparatively mild pressures of ordinary life. So long as our powers of adjustment are adequate to what is demanded of us, we may be worried and depressed at times but never out of proportion to the causes. And we shall recover as soon as the cause is removed.

As soon as we begin to fail to make an objective adjustment to the demands made upon us the signs of strain will appear. These may either be in the form of uncontrollable anxiety which fastens on matters other than its real cause, or they may be one or the other methods of dodging the issue mentioned above—repression, dissociation, or phantasy. Rest and an honest attempt to face up to the situation and accept one's own limitation may help at this point, but as soon as the individual finds that he can no longer compete with ordinary life, the services of a psychiatrist should be sought.

SUMMARY

1. What is the subject-matter of psychology and what are its methods?

Psychology is the study of normal behaviour among human beings or animals. It first used the method of introspection or observation of one's own thoughts and reactions, but as this has limitations it was later supplemented by controlled observation and experiment. Situations can be set up in the laboratory in which one factor can be varied at a time and the results noted. These can at times be supplemented by field observations of individuals in ordinary life situations.

2. What is the subject-matter of psychiatry? Is it only concerned with "mad" people?

Psychiatry is concerned with mental illness or abnormality. There are comparatively few forms of this which render people "mad" or completely unfitted ever to take part in ordinary life. Mental defectives are of such limited intelligence that they cannot look after themselves in the normal world, while people with severe delusions have to be shut up for their own protection.

3. What less serious forms of mental illness are there?

Various forms of neurosis may handicap an individual quite seriously, but these are usually temporary and curable. Most neuroses spring from conflict, or the existence of two incompatible impulses in the mind at the same time.

4. What are the means of dealing with conflicts?

When a conflict arises in the mind of a normal person he may either *suppress* one of the two impulses or *sublimate* it and so resolve the situation. Unresolved conflicts, however, may lead to *dissociation* or the splitting off of one part of the personality, any incongruities being *rationalized* or explained away to the individual's own satisfaction. In other cases one of the impulses may be *repressed* or forced down out of sight and its very existence denied. This can be dangerous, for the repressed impulse often makes itself felt in indirect and unpleasant ways.

5. What other symptoms are there of inability to deal with the adjustments required in ordinary life?

Phantasy is one means of escaping from real life into a day-dream, and *psychogenic illness* produces symptoms which make it unnecessary for the individual to go on trying. Disproportionate anxiety also shows that the strain of the adjustment called for is becoming too much for the individual.

PART II—INDUSTRIAL PSYCHOLOGY

CHAPTER VIII

INTRODUCTORY

By now we have a fair idea of what the experimental psychologist has to tell us about the individual human being. We have seen how man acquires information about the outside world through his senses—sight, hearing, and the like—and how he organizes that information into meaningful perceptions; we have seen how these perceptions are stored in his memory and how new experiences can be classified with them either in the real world or in thought. The learning process, the motivation of the individual, and his feelings and reactions to situations—all these have been dealt with in objective terms by experimental psychologists who have assembled a considerable body of knowledge about them. There are still gaps in that knowledge as has been pointed out above, but the conclusions so far reached are reliable and valid because they have been arrived at by the methods of science. They can be verified by anyone who cares to repeat the experiments and observe the same facts.

But so far this "individual human being" we have been thinking of remains an anonymous abstraction rather than a living person. He has been the subject of innumerable experiments on sensation and perception but he seems to have no life of his own and no real existence outside the laboratory. He has, in fact, little in common with the ordinary people we meet from day to day.

In real life people are usually seen in the context of some meaningful activity. They are fathers of families, taking their place in the life of the home; they are members of bowling clubs, collaborating in the playing of a game during their leisure time; they may be shop assistants, machinists or farm labourers, earning their living by taking part in the economic activities of the community. Each of these activities forms an area in the existence of a man (or woman) and it is within this that his significant life is lived. If we wish to understand individuals outside the laboratory we must consider them in one or other of these phases of activity and study their behaviour in that particular environment. The environment which concerns us at the moment is that of industrial work.

THE DEVELOPMENT OF INDUSTRIAL PSYCHOLOGY

One result of the Industrial Revolution was to make a wider separation between people's working life and the rest of their activities. Formerly a great deal of productive work had been carried out in the home during the less busy seasons of the farming year. Tasks had been shared out among the members of the family and work, home life and relaxation had been informally intermingled. With the advent of power-driven machinery, however, more and more people came to be assembled in factories where they worked together for a fixed number of hours in the day. Particularly in the early stages there were many unfortunate aspects of this setting up of work-communities which cut off people's economic activities from the rest of their lives. These must be balanced against the astonishing increases of productivity by which the factory system was enabled to turn out enormous quantities of relatively cheap goods.

From the psychologist's point of view the Industrial Revolution meant that most work was carried out in special environments, and that many individuals were engaged on definite tasks which were repeated with little variation throughout the working day. Industrial work had taken on its present-day character, losing the variety and informality of the self-contained village economy and throwing up the characteristic problems of large-scale repetitive production. New skills were called into being and new adjustments were demanded of those who practised them.

The first incursion of the experimental psychologist into industry in this country was in 1917. During the war which was then in progress the development of barbed wire for strengthening field fortifications and of automatic weapons firing hundreds of rounds a minute had lent an enormous accession of strength to the defence. Attacking infantry could be mown down from virtually impregnable positions, unless these were subjected beforehand to heavy bombardment by artillery. Fire-power had to be increased rapidly and substantially and this meant an enormous expansion of the munitions industry at home. New factories were set up throughout the country and thousands of workers, many of whom had never worked in industry before, were recruited into them. Long hours were worked, processes were broken down and jobs simplified, and the shells and cartridges began to roll out in the required numbers.

Unfortunately, however, there were other results also. Sickness began to increase among the workers, accidents multiplied, and public attention came to be drawn to the fact that all was not well within the munition factories. A committee was set up under the name of the "Health of Munition Workers Committee" to study the subject. Some of the members of that committee had been trained as experimental psychologists.

THE METHODS OF INDUSTRIAL PSYCHOLOGY

The immediate problems which were presented to the Health of Munition Workers Committee were twofold. Briefly they had to find out—

1. Why there was so much sickness and other difficulty among munition workers.
2. How it could be reduced.

The methods at their disposal were greatly improved by the experience of the psychologists among them, for they brought with them all the techniques, which had been developed in psychological laboratories, for observing human behaviour. They were thoroughly conversant with the applications of the scientific method in this field as it had been developed over the last thirty or forty years.

The result was that instead of dealing in windy generalizations about the effect of factory work on women previously unaccustomed to these conditions, the Committee started by the painstaking collection of facts—facts about hours of work, facts about output, and facts about the actual incidence of sickness. As one would expect from the history of science, regularities began to appear and fluctuations in the rate of output began to link up with certain variations in the hours and conditions of work. Soon it became possible to devise situations in which hours were experimentally altered in order to prove or disprove certain hypotheses about their effect on the rate of output.

In this way a body of verifiable knowledge began to be built up, most of which remains reliable and valid today. In the early stages it dealt mainly with hours of work and other factors which tended to induce fatigue, and when it was decided that the Health of Munition Workers Committee should continue its work and extend its scope, its name was changed to the "Industrial Fatigue Research Board." Gradually, however, other matters came to be studied, such as posture, methods of work, the design of machinery, heating, lighting, and ventilation, and the name was changed to its later title of the "Industrial Health Research Board." Most of this Board's valuable work consists in the application of the methods of the experimental psychologist to the study of human behaviour in the work-situation.

In 1921, Dr. Charles S. Myers, who was then Director of the Cambridge Psychological Laboratory, became convinced that the young science of experimental psychology had an important contribution to make to British industry. With the collaboration of a committee of business men, headed by Mr. H. J. Welch, he set up the "National Institute of Industrial Psychology," a scientific body operating on a non-profit-making basis, to make available the results of psychological knowledge to industry and commerce and to undertake further research in these fields. During the last thirty years or so the development of industrial psychology in this country has been carried out largely through the agency of these two bodies.

THE SUBJECT-MATTER OF INDUSTRIAL PSYCHOLOGY

Industrial psychology is the study of human beings in the work-situation, but the issue is complicated from the start by the fact that there are many different kinds of work-situation. The reader is probably already aware of the complexity of the industrial and commercial scene and of the wide variety of jobs which exist within it. But there is a further problem peculiar to the industrial development in this country, in which the typical firm is the small one. Of the firms engaged in productive industry over 92 per cent employ less than 250 employees, while well over half the working population earns a living in firms of that size or less. Each of these firms has its own methods and its own standards, so that the already wide range of jobs is further extended by the large number of firms in which they can be done. It is unrealistic therefore to think in terms of a given number of standard work-environments; we must consider an almost infinite number of variations.

This variety, added to the fact that the individual tasks to be carried out within these job-situations are usually specialized and often repetitive, has drawn attention to the importance of putting the right person into the right job. The variations between individuals are just as great as those between jobs. If we look around we shall see that some are tall and some are short, some are pleasant and some disagreeable, some are quick in the uptake and some are slow, and so on. Many of these differences have been studied systematically by psychologists and this knowledge can be of considerable service in matching up people with the kind of work for which they have the capacity, aptitude, and temperamental qualities, and in which they are likely to find success and satisfaction.

The psychology of individual differences, which is dealt with in Chapters IX and X, provides the theoretical foundation for *vocational guidance*—advising individuals about the kind of work they should enter—and *vocational selection*—choosing the most suitable person for particular types of employment (Chapter XI). The methods involve the testing of various human attributes which have proved to be measurable—intelligence, attainments, and special aptitudes—and of estimating others which are more difficult to reduce to an objective basis. More important, perhaps, is the investigation of an individual's past history during an *interview* and from it predicting the main lines of his future development. This is dealt with in Chapter XII. A recent development in methods of vocational selection is outlined in Chapter XIII.

Once we have decided on the most suitable job for a particular individual we have to consider how he can be *trained* most economically and effectively in the necessary skills. Here we draw on the psychology of the learning processes and deal with it as the problem of industrial training in Chapter XIV. By utilizing this knowledge in the drawing up of a training scheme we shall avoid wasting time and effort.

Motivation is an important element in training as indeed it is in every aspect of the work-situation. Here again variations are apparent, for people respond differently to different *incentives*. There are various ways of compensating extra effort and encouraging individuals to aim at satisfactory standards at work. Many of these aim at linking up remuneration with performance on the job, not always with complete success. Some account of the question is given in Chapter XV.

The study of work has revealed many variations in method, some of which are effective, while others impose a disproportionate strain on the operator. The *methods* of studying and recording different kinds of job are dealt with in Chapter XVI, along with the conditions which govern the most effective application of human effort to work. This leads on to the *physical conditions of work*, for the recording of output rates has revealed variations which link up with the arrangement of hours, the lighting, heating, and ventilation of the work place, the incidence of noise, fumes, and other unpleasant conditions. Fatigue and boredom are also considered under this heading in Chapter XVII.

Lastly there is the question of *accidents* at work (Chapter XVIII). When these are adequately recorded they are seen to centre round certain places and types of machinery which are recognized as sources of special danger. Measures can be taken to reduce this danger, but these are not always as effective as they might be on account of the human element.

SUMMARY

1. Can we achieve an adequate understanding of human beings by studying them in the laboratory?

No, because the most significant aspects of an individual's life are lived in contact with others while engaged on some common activity. Industrial psychology is the study of human beings in the work-environment.

2. What are the principal characteristics of the work-environment?

In an industrial country most work is carried on in specialized groups by highly developed, subdivided processes in which the individual's task is only a minute part of the whole. Such tasks in these specialized work units demand new adjustments on the part of the individual.

3. When did industrial psychology emerge as a special study in this country?

In 1917, when the Health of Munition Workers Committee was set up to consider sickness among women war workers. This body has continued to study the subject under the title of the Industrial Health Research Board. After the 1914–18 war the National Institute of Industrial Psychology was set up by Dr. C. S. Myers for a similar purpose.

CHAPTER IX

INDIVIDUAL DIFFERENCES

THERE is no need to draw special attention to the fact that human beings differ one from the other. To stand in a busy thoroughfare and watch the crowds passing is to see a continual variety of features and expression, of stature and build. No two are exactly alike and if an acquaintance appears among the passers-by we recognize him at once, without any danger of confusing him with any of the hundreds of others. This uniqueness of the individual has been shown to hold in certain unexpected characteristics like fingerprints, no two of which have been found to conform to exactly the same pattern.

Such differences, however, are variations between certain definite limits. Human beings, apart from the very occasional monstrosity, have the same number of eyes, ears, and limbs, and their features are arranged in the same general pattern upon their faces. In stature they are seldom much less than, say, four-feet-six in height as adults, nor are they frequently found more than six-feet-six tall. Their weight, girth and other measurements will also be found to be restricted within a certain range of variation.

We are dealing, therefore, with variations within certain limits, and these limits are often quite surprisingly narrow. How is it, then, that the individual remains unique when his range of variation in any one characteristic is limited?

The reason is, of course, that human beings can vary in many different characteristics. Some of these can be measured in inches or in pounds and ounces, while some are concerned with less tangible matters. Scales of variation have been established for some of these characteristics and we know, for example, what is the average height of adult males in this country. But if we have two men, both of whom are exactly average in height, they may still be quite different, even in physique. One may be fat and the other thin, one may be dark and the other fair, one may be symmetrical in build while the other may be misshapen or ungainly. And when we come to take their mental characteristics into account, the differences between the two may be even more strongly marked.

THE EXPERIMENTAL APPROACH TO INDIVIDUAL DIFFERENCES

To make sense of these differences between individuals, we must obviously approach them with some caution. Two questions are involved. The first concerns the variations between individuals in certain definite characteristics, and the second deals with the arrangement of those variations in each individual which makes up his unique personality. (We are using the word personality to mean all the characteristics which make up the complete individual.) It will be easier to deal here with the first of these questions and to leave the other until the following chapter. This will not only follow the logical order, but it will enable us to deal with the studies which have been made on the subject in their historical order as well.

In the later years of the last century a number of scientists, among whom was Sir Francis Galton, became interested in human measurements. They gave their studies the somewhat clumsy name of *anthropometrics* and they set about collecting as many measurements of human beings as they could. It was soon apparent that when they concentrated on any one characteristic among people of the same race and sex, regularities in the distribution of differences were beginning to appear.

In studying the heights of adult males, for example, the following scale might be drawn up—

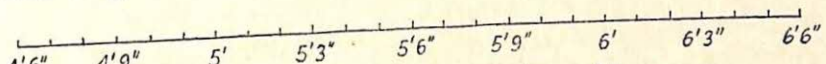

FIG. 13. SCALE OF HEIGHT FOR ADULT MALES

As they were collected, cases would be placed in the appropriate measurements on the scale. When a hundred observations had been made the distribution would look something like that shown in Fig. 14, each case being represented by an O.

When we join up the tops of these columns as on a graph, the curve will look like that shown in Fig. 15.

This bell-shaped curve kept making its appearance whenever these human measurements were studied, provided that a substantial number were recorded, and provided that they were adequately representative of the same racial and cultural group. If African pygmies were mixed up with tall Zulu warriors the results, as one would expect, would not show the same regularities.

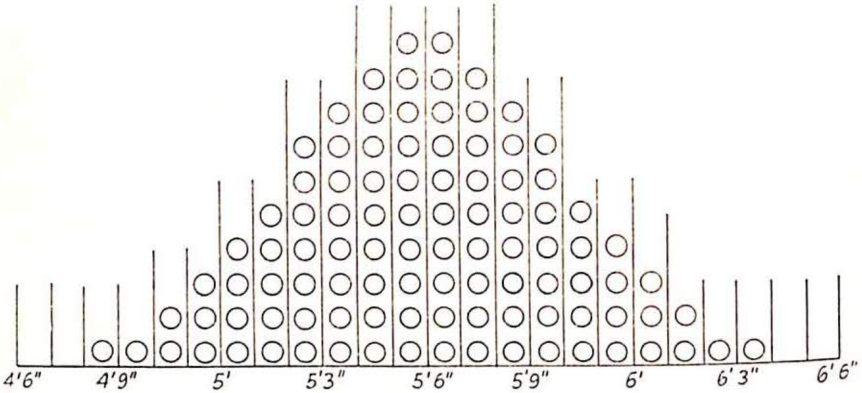

Fig. 14. A Hundred Cases Arranged in the Scale

The Curve of Distribution

Physical measurements, such as height, weight, length of arm, girth, and so on, when studied systematically among people of the same race and culture showed this regular bell-shaped distribution. Such a curve shows that the measurements were grouped round a central tendency, most of them being in an average category—in the hump of the curve—and the remainder tailing off fairly symmetrically above and below the average.

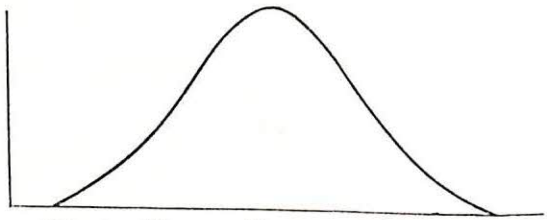

Fig. 15. Normal Curve of Distribution

Now certain other studies, for example in the fields of botany and zoology, had shown similar distributions within a species. In certain kinds of plant, for example, there might be a maximum and a minimum number of leaves. Within that range, the actual distribution of the number of leaves among many specimens would show the same bell-shaped curve.

Is there any reason why this should be so? If we pause for a moment to consider the theory of probability we shall find that there is. Take, for example, a situation where there is a certain number of possibilities such as in the tossing of pennies. If we have two pennies and toss them, there is one chance that they may both fall with their heads up, and one chance that they may both fall with their tails up; there are, however, two chances that they may fall one heads and one tails. (Shown diagrammatically in Fig 16.)

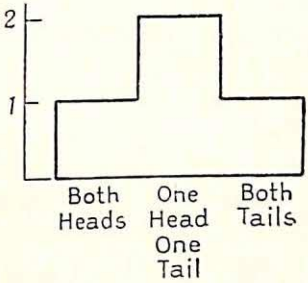

FIG. 16. CHANCES OF TWO PENNIES FALLING HEADS AND TAILS

Suppose we have six pennies, the chances will be as follows—

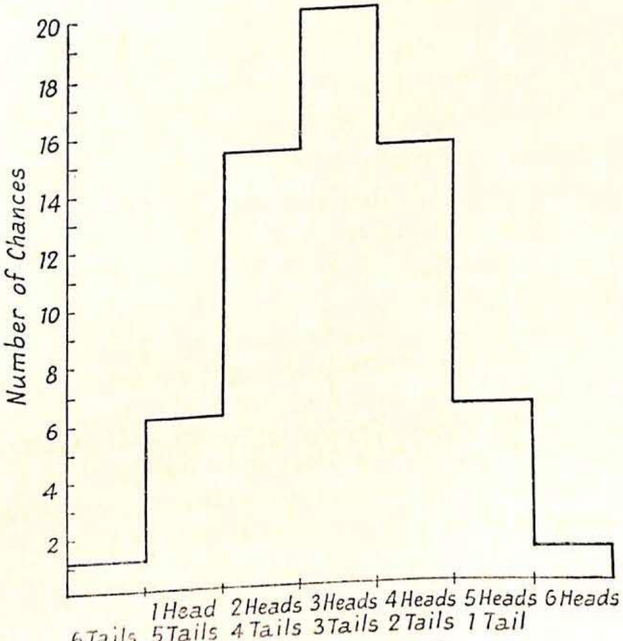

FIG. 17. THEORETICAL CHANCES OF SIX PENNIES FALLING HEADS AND TAILS

In both these cases the same bell-shaped curve is making its appearance again. Here is an actual example from tossing six pennies 100 times—

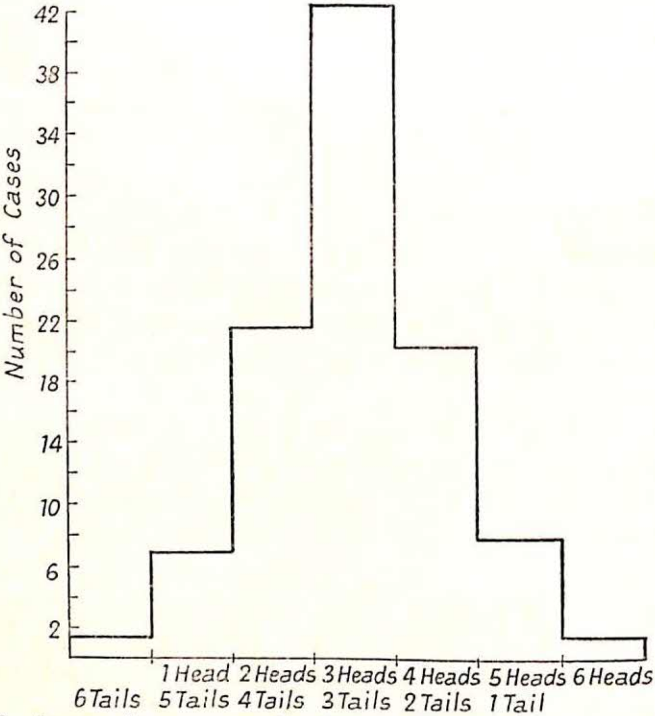

Fig. 18. Actual Examples of Six Pennies Falling Heads and Tails

The reader can provide other examples for himself if he cares to take a number of pennies, shake them up in a box, throw them out and record the results.

If we have a range of variation, therefore, as we have within the members of the same species, the laws of chance tend to bring about a distribution of cases according to this curve. The curve actually is known as the Normal Curve of Probability or the Gauss Curve of Error, after the man who first studied it mathematically.

Scales of Variation

The studies in human variation had reached this point by the end of last century, and it may be profitable to pause for a moment on the significance of what had been achieved. Up to this point we have been concerned with tangible measurements which could be expressed in inches or in pounds and ounces.

In each of the physical dimensions studied, the same regularity of distribution had been found. When individuals in a homogeneous and representative group were ranked for height they would be found to be arranged more or less symmetrically around the average with decreasing numbers above and below. A scale for height could then be established and if any new individual were produced his height could be measured against it and shown to be above average or below, very much above or very much below. The same process could be repeated for weight, colour of hair, girth, and many other physical characteristics. All of these were found to conform to the expected law for the distribution of variations within a species.

The first of our two questions, that of the variations of individuals in terms of certain characteristics, seems to be approaching an answer, at any rate in the sphere of physical measurements. What was happening in the sphere of mental measurements?

Several attempts had been made to give quantitative expression to mental differences, mainly in the sphere of perception. But it was not until 1906, when a French physician, Alfred Binet, was charged with the duty of deciding which of the Paris school children were too dull to profit by education in the ordinary schools, that the matter began to take a recognizable shape. Binet began by asking the children a series of simple questions, the answers to which did not depend on special knowledge, such as "What is your name?" "How old are you?" "How many pennies have I got here?" When he recorded the number of correct answers given by children in any one age group, he found that the same bell-shaped curve of distribution was appearing again.

There is something rather dramatic about this moment in the development of science, for it marks a new departure in our understanding of individual differences. Rules which had already been established in the field of tangible physical measurements which could be expressed in inches or in pounds and ounces were making their appearance in the field of intangible mental measurements which it had not been possible in the past to express in objective terms at all. Binet's work is notable for two reasons. In the first place it suggested that the regularities already observed among physical measurements were to be found among mental measurements also; and in the second place it showed that an objective means could be devised for measuring some mental attributes.

THE DEVELOPMENT OF MENTAL MEASUREMENTS

The years since Binet's studies among Paris school children have seen almost uninterrupted research and development in mental testing. Binet's series of questions were translated into English and norms of performance were built up for children and adults in this country and in the United States. The tests proved very useful in deciding why certain children were doing badly in school work and seemed to have an additional use in showing which adults could be entrusted with certain types of work. This latter development led the American Army authorities, when they were faced with allocating large numbers of men to different trades and arms of the service in the First World War, to ask the pyschologists for help in their classification.

For this purpose two tests were devised—one, the Alpha test, being in the form of words, and the other, the Beta test, being in the form of pictures and diagrams so that it could be applied to illiterates and those who did not understand English. These tests could be given to groups of people at the same time, instead of only to one individual at a time as had been the case with the Binet scale. They ushered in a new area of large-scale testing (the Alpha test was given to nearly two million recruits) and they permitted the study of results in relation to all kinds of different occupations. From then until the present day the following conclusions have become clear—

1. If a large number of people from the same culture-pattern and of comparable ages are given a standard mental task, drawn up according to certain conditions which are now understood, their performance, as expressed in terms of a score, will fall into something approximating to the Normal Curve of Distribution.

2. If the same people are given a similar task after an interval their scores will fall into the same distribution; moreover the individual's scores will remain in approximately the same position in relation to the average. Those who gained a low score the first time will tend to gain the same kind of score on the second trial. This suggests that the test is measuring something which does not change from week to week, but remains stable in the individual's mind.

3. When the scores on these mental tasks are compared with any other criterion of ability, such as the opinion of others, success in school work, or the ability to undertake jobs which require quickness and accuracy in comprehension, there is a very marked tendency for those who do well in the tests to be ranked high in the other activities also.

The Significance of Intelligence Tests

These standard mental tasks, known as "intelligence tests," provide us with a means of ranking individuals in respect of a particular mental quality. It is perhaps a little misleading to call this "intelligence," for the day-to-day meaning of this word may not be exactly the same as what these tests seem to measure. This has been defined with some care as "the ability, when we have some aim or question in mind (*a*) to discover the relevant qualities and relations of the objects and ideas that are before us, and (*b*) to evoke other relevant ideas." In more general terms it might be thought of as the quickness and accuracy of comprehension.

It now becomes possible, then, to classify people into various categories with regard to this trait. About 40 per cent of people will fall into an average category, that is to say they will be capable of completing a secondary modern school education up to fifteen and should be suitable for a normal skilled job. About 20 per cent of people will fall into a category just above average, that is to say they will be capable of completing a secondary technical school or perhaps a secondary grammar school course, and should be suitable for supervisory technical jobs, or perhaps will succeed as small tradesmen. A similar proportion, 20 per cent, will be just below average, that is to say they will find difficulty in completing a secondary modern school course and will tend to get stuck one or more classes from the top or be relegated to a lower or "C" stream. In working life they will find difficulty in becoming skilled workers and will tend to remain in the labouring or unskilled levels.

A fairly small proportion, say 10 per cent, will fall into a category very much above the average: they will prove able to deal with higher education, up to G.C.E. Examinations or University standard, and will probably be suitable for higher-grade posts such as business executives, administrative-grade civil servants, lecturers, research workers, and the like. A similar proportion (10 per cent) will be well below average and will find difficulty in making anything of education in the ordinary schools; when they leave they will in most cases only prove suitable for the very simplest types of work.

We must emphasize again that these tests measure only one aspect of the human mind, namely its quickness and accuracy of comprehension. A great deal of the controversy which intelligence tests have aroused—and at one time and another there has been a lot of controversy—has been due to a misunderstanding of this point. A high score in a test means that an individual has the intellectual ability to profit by higher education or to cope with a high-grade job, but it is no guarantee that that ability will be put to effective use in that particular sphere. For this we must rely on information about other aspects of his personality. This we shall deal with in the following chapter.

A Note about Intelligence Quotients

As will be seen from the foregoing, an individual's score on an intelligence test means nothing until it has been expressed in relation to the average for people of the same type. Scores are frequently expressed in grades, therefore, which represent the different levels in the curve of distribution. One which is widely used is the following five-point scale—

A	representing	the top	10 per cent;
B	,,	the next	20 per cent;
C	,,	the middle	40 per cent;
D	,,	the lower	20 per cent;
E	,,	the bottom	10 per cent.

These would appear diagrammatically as follows—

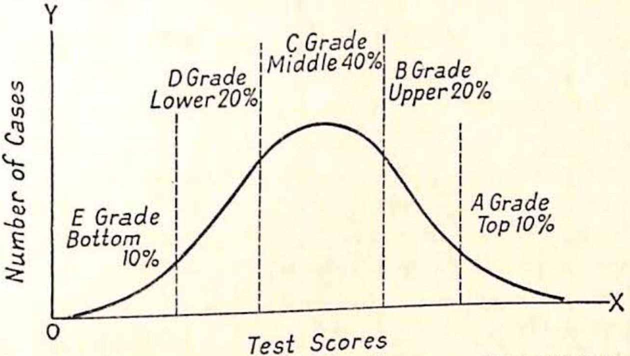

FIG. 19. GRADINGS RELATED TO CURVE OF DISTRIBUTION

Another method is in terms of percentile rankings, that is to say by equating the group to 100 and placing a score as, say, better than 85 out of 100 or better than 25 out of 100.

A major difficulty, however, arises in the testing of children, for scores on intelligence tests rise with age until adolescence is reached. A child of twelve years, therefore, will gain a higher score than a ten-year-old simply because it is two years older. In these circumstances how can the scores of children of different ages be compared one with the other?

The normal means is to work out the average score for each age group, eight years old, nine, ten, and so on. Once this has been done any child's score can be expressed in terms of these age groups. Suppose, for example, that a child gained a score which was exactly the average of twelve years old. This score could be taken, therefore, as representing a "mental age" of twelve.

But if our child's actual age in years (or chronological age) was only ten, then it would be obvious that it was the equivalent of two years ahead in general ability. This difference can be expressed in the form of a ratio, known as the *Intelligence Quotient*, viz.—

$$\frac{\text{Mental Age}}{\text{Chronological Age}} \times 100 = \text{Intelligence Quotient.}$$

In the case just noted this would be—

$$\frac{\text{Mental Age}}{\text{Chronological Age}}\ \frac{12}{10} \times 100 = \text{I.Q.} = 120.$$

A child whose ability was above the average for its age group would have an I.Q. of more than 100, while one whose ability was below would have an I.Q. of less than 100. A child who was exactly average would have an I.Q. of just 100. There is nothing in the least mysterious about Intelligence Quotients; they are simply a means of expressing a child's test score in relation to its age and thus making it possible to compare children of different ages.

SUMMARY

1. What was the first systematic approach to the study of individual differences?

The work done on human measurements by Sir Francis Galton probably marks the beginning. After assembling information about the height of large numbers of comparable individuals, he found that they were distributed graphically according to a characteristic bell-shaped curve. He found the same curve appearing in the measurements of other physical characteristics.

2. What is the significance of the Normal Curve of Distribution?

It represents a random distribution within given limits of variation, as in the case of a number of pennies which can fall in certain groupings of heads and tails, or as in the case of certain characteristics within a species. In a normal curve, measurements are grouped round a central tendency or average with decreasing numbers tailing off symmetrically above and below.

3. What was the significance of Galton's work?

It showed that with sufficient numbers within a particular culture-pattern, a certain regularity could be expected in the distribution of one particular measurable characteristic. Even though there were many such characteristics in each individual some of which had not yet been expressed in quantitative terms, this was an important advance.

4. When did the same regularity make its appearance in mental measurements?

In 1906 Binet, in his study of Paris school children, recorded their answers to a list of simple questions. Within each age group he found that the numbers of questions answered correctly were falling into a normal curve of distribution. Thus the regularities established by Galton in the field of physical measurements were making their appearance in the sphere of mental measurements also.

5. What have been the main developments in intelligence testing since the time of Binet?

Millions of people have been subjected to individual and group tests since then and the following conclusions emerge—

(*a*) If large numbers of people within a culture-pattern are given a standard mental task, their scores will fall into the Normal Curve of Distribution.

(*b*) If the same people are re-tested after an interval, their scores will remain very closely in the same relation to the average.

(*c*) These scores will bear a close resemblance to other estimates of their general mental ability.

6. How should intelligence test scores be handled?

With considerable care. They are an estimate of one aspect of the individual's mind, which has been defined as "the ability, when we have some aim or question in mind, to discover the relevant qualities and relations of the objects before us, and to evoke other relevant ideas." Certain levels of this ability have been shown to be essential for certain types of occupation, but the possession of this ability is no guarantee that it will be put to effective use.

7. What is an Intelligence Quotient?

Children's test scores increase with age up till about sixteen. An Intelligence Quotient, by allowing for these differences, makes it possible to compare one child with another. It is calculated by dividing the mental age by the chronological age and multiplying the result by 100.

CHAPTER X

THE COMPLETE PERSONALITY

Now that we have acquired some understanding of the difference between individuals along any one scale of variation we shall expect that when a representative group is considered in terms of one definite and measurable characteristic its members will rank themselves in an order which approximates to the Normal Curve of Distribution. There still remains the question of how many scales of variation we are to take into account, and how we deal with all the different attributes of one individual which may be ranked on different levels on all these scales. We must start, then, to consider the whole individual and try to understand how all his different qualities are put together into the unique pattern which is his personality.

As to the scales of variation we may employ and the human attributes we may consider along them, there are first the physical dimensions of an individual—his height, weight, girth, and so on. These can be measured in inches or in pounds and ounces and the distributions of these measurements can be studied by the normal processes of calculation. There will therefore be no difficulty in determining whether an individual is above or below average height, and by how much he is above or below. Usually the most convenient method is to express these measurements by placing the individual we are concerned with on a scale composed of a hundred representatives of the population from which he is drawn. We may then say that in height he is taller than eighty out of a hundred of the population, thus showing not only that he is taller than average, but also giving some idea of how much above average he is, i.e. by using a percentile scale as described above.

But these crude physical dimensions are of rather limited value, for we are usually going to be more interested in an individual's general fitness, his powers of endurance, his strength and robustness, or his liability to illness and absence. Height and weight are of limited value in considering these matters, which depend on much more subtle aspects of the individual's physique. Moreover, as laymen, we are unable to judge them, except by a superficial impression that one person looks fit and strong while another seems rather delicate. If we want to get some idea of an individual from this point of view we shall do much better to call in a medical man and ask him to give us an opinion.

OTHER ASPECTS OF PHYSIQUE

On this question of variations in physique, however, there are differences which have little to do with measurements and which the layman can assess quite satisfactorily for himself. These concern the "first impression" which an individual makes upon other people.

When we meet someone for the first time we can usually say to ourselves after one rapid glance "This is quite a pleasant-looking fellow" or perhaps "This is an odd-looking chap." A few moments' conversation, and we are probably in a position to say either "This is an agreeable person to talk to" or "This is rather an uncouth individual." Such judgments may be quite important when we are making up our mind about someone, and it is as well to dwell for a moment on the kinds of impression on which they are based.

Our initial impression will be formed largely from a person's appearance. This is made up of the regularity of his features and the symmetry of his body together with the expression on his face and the rhythm of his movements. It might be possible to consider all of these separately and in detail, and to try to arrive at an objective ranking, but this would be an incredibly tedious job and might not in the long run prove to be of much practical value. If we must have a scale of variation we might simply think of categories like "well-built with regular features," "average," and "handicapped by some disfigurement," or something of the sort.

Art can improve on nature, however, and the way an individual turns himself out can do a great deal to offset the original handicap of his appearance, while on the other hand it can detract from an otherwise pleasant initial impression. Personal cleanliness and attention to such details as hair, nails, and teeth, will go a very long way to improve the first contact.

The same applies to the choice of clothes and the way they are worn.

Once we have entered into conversation with someone we become aware of his voice, which may be agreeable in tone and modulation or harsh and unpleasant. His manner of speech will be shown in his choice of words and the correctness of his grammar and phrasing, while any local accent or inflexion will also be noticeable. While the other points we have considered will largely be noted by the eye, these latter are more concerned with the impression an individual makes on the ear. Once again there will be differences, for one's experience shows that the sound of a known voice can be recognized at once, even though the speaker cannot be seen.

Still another aspect of the first impression made by an individual is his manner of dealing with a situation which involves other people. Some show a considerable degree of poise and self-possession and can meet new people without ever showing themselves at a loss. Others are self-conscious and awkward and either show themselves nervous and embarrassed or pushful and aggressive in an unfamiliar environment. In some cases the mere lack of experience will be the cause of uncouth behaviour, while in others the reason may be more deeply rooted. Whatever the original source, the fact remains that most people have their own characteristic way of behaving among their fellows.

THE FIRST ASPECT OF AN INDIVIDUAL

We have come a long way, then, from our simple measurements of height and weight and their relation to the average of a similar group. There are many other elements in an individual's physique, most of which cannot be measured by such simple means. Some of these are innate, that is to say, they were there at birth or they developed during adolescence, and the individual can do little to change them. "Canst thou by taking thought add one cubit to thy stature?" Others have been acquired during the course of his experience and can be modified either by taking a little thought, such as for dress or personal cleanliness, or by a slightly more long-term effort, as in the case of manner and speech.

It might be possible to arrange all these matters into a number of scales and to rank individuals by observation or measurement. The result might be something like this—

General Heading: Physique....

Height	ft in.
Weight	st lb
Waistline	in.
Physical strength	Very strong Average Weak
Powers of endurance	Can stand up to most things Average Unable to bear hardship or exposure
General impression of health and robustness	Seems fit and strong Average Rather sickly and puny-looking
Stature	Well built Average Badly shaped
Appearance	Regular features and pleasant expression Average Unattractive face and expression
Voice	Pleasing Average Disagreeable
Speech	Pleasant and correct Average Unsuitable mannerisms and mistakes
Poise	Self-possessed Average Self-conscious
Manner	Friendly Average Awkward and inexperienced

This is quite a long list and it might involve quite a lot of labour to note down a rating under each heading, and still more to arrive at some degree of agreement on what shall be considered average for each category. There is also a possible danger that even when we had made all our ratings we should still be unable to convey an adequate impression of the individual to another person. One can, for example, imagine the exceptional case of someone who is badly shaped, has an unattractive face and expression, who makes mistakes in grammar and has a local accent, is self-conscious, awkward and inexperienced, but is nevertheless rather a charming person to meet. The essential individuality may sometimes get lost in a multiplicity of ratings on too many scales, and if this can happen with the limited aspects of an individual we have so far considered, what will be the result when we come to think of the whole man?

When we are dealing, then, with a complex pattern, it is obvious that we must think not only about the ratings of individual traits, but also about their relation to each other and to the whole pattern. For this reason it may be more practically useful to reduce the number of scales on which ratings are to be made and to aim rather at giving a description of the individual from the aspects under consideration. The result would be the following less analytical but perhaps more meaningful assessment—

Health and Fitness—Tall (5 ft 11 in.) and well built (12 st 8 lb). Seems strong and robust, no signs of ill-health or disability.

Appearance and Turnout—Quite a pleasant-looking young man, neat and tidy, wearing a business suit, well-chosen tie, etc.

Voice and Manner—Speech clear and correct with a slight West Country tinge. A little self-conscious but with an agreeable friendly manner.

Under this general heading of *Physique*, therefore, we may group a number of related aspects of the individual. We can make use of various ratings on such scales as are available, but we may find them of less help than we might expect. Over and above the ratings we may make some effort to comprehend how the various characteristics are put together and arrive at some assessment of the general pattern from this point of view.

THE EFFECTS OF EXPERIENCE

We are born with certain endowments which develop throughout our childhood and reach their maturity by the time we are adults. Some of these we can do very little about: for example if we have blue eyes we cannot change them to brown, or if we have red hair we cannot change it permanently to black. But many of our endowments depend for their development on how we live, what experiences we pass through, and whether we put them to good use. It is no longer possible to say, for example, that a child's physique is determined at birth, and that he will reach certain dimensions and no more by the time he is an adult. Recent developments in preventive medicine, better feeding, and more enlightened care in the early years have resulted in significant gains in the average height and weight of children in this country. We have taken thought and added a cubit, not to our own stature, but to that of the next generation.

The same thing applies to mental characteristics. We appear to be born with a certain endowment of general ability which reaches its maximum in adolescence, but the use we make of this will vary and consequently we shall be able to put it into effect with different degrees of success in ordinary life. The highly intelligent child who passes his childhood in seclusion, out of touch with other children, and gaining no education, will at the age of sixteen be completely at a loss in comparison with a less gifted child who has been to school and who has taken his part with other children.

How far our present effectiveness is due to what we were born with and how far it is the result of experience is very difficult to say. In some cases people seem very largely to have made their own way and in others they seem to be mere products of a certain environment. In most cases, however, the interaction between the two is very intricate and delicate, and calls for considerable interpretation before we can by certain that we understand it. In every case, however, we must take both into account if we are to sum up an individual adequately.

This means that we must look at an individual from a second aspect, one which we may call *attainments*, for it embraces everything that he has actually done in the past. In practice we shall probably find that we are principally interested in three things under this heading.

The first of these is his *general education*. We want to know what kind of school he went to and how long he stayed there. We want also to see what use he made of his opportunities and what standards he reached. This is not usually difficult and inexperienced, but is nevertheless rather a charming person to meet. The essential individuality may sometimes get lost in a multiplicity of ratings on too many scales, and if this can happen with the limited aspects of an individual we have so far considered, what will be the result when we come to think of the whole man?

When we are dealing, then, with a complex pattern, it is obvious that we must think not only about the ratings of individual traits, but also about their relation to each other and to the whole pattern. For this reason it may be more practically useful to reduce the number of scales on which ratings are to be made and to aim rather at giving a description of the individual from the aspects under consideration. The result would be the following less analytical but perhaps more meaningful assessment—

Health and Fitness—Tall (5 ft 11 in.) and well built (12 st 8 lb). Seems strong and robust, no signs of ill-health or disability.

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The second sub-heading we may call *special training*. This embraces all formal instruction which is aimed at equipping the individual for a particular task, as distinct from contributing to his general education. It ranges from apprenticeship to a trade up to the professional training of a physician or barrister.

Thirdly we are concerned with an individual's *experience*. Taken by itself this term is much too wide to be of much practical use, so we must narrow it to experience in work which is relevant to the purpose we have in mind at the particular time. We must consider what positions he has held, the duties they involved, and the levels of responsibility he has reached.

With these three headings in mind we shall, for practical purposes, gain some idea of the experiences an individual has undergone in the past, and what levels of attainment he has reached.

GENERAL INTELLIGENCE AND SPECIAL APTITUDES

In the last chapter we considered how individual differences in mental characteristics are distributed, and we found that performances on a standard mental task would fall into something like the Normal Curve of Distribution with a suitable group. We also saw that different levels of performance seemed to link up with what could be expected of the individual in other life-situations.

We are thus provided with a means of measuring "general intelligence," words which may have various meanings in ordinary speech, but which the psychologist uses in a definite and accepted sense (see p. 101). Obviously those who are endowed with a high level of this ability are likely, other things being equal, to be more effective in the situations of ordinary life than those who have less. This scale of variation will prove very useful in assessing an individual and so long as we are assured (*a*) that the estimate of general intelligence is accurate, and (*b*) that there is nothing to prevent this level of ability from being effective in ordinary life, we shall be able to sum up people very adequately from this aspect.

In addition to general ability, however, there are certain aptitudes which seem to fall into the same kind of distribution and which can be estimated by similar means. If we set a number of people a standard task which depends mainly on working out mechanical problems we shall, subject to the conditions noted above, be likely to get a normal curve. When we compare the performance of individuals with their ability to pick up mechanical work or to profit by mechanical training we shall find in the majority of cases that those who do well on the standard task tend also to do well on the job, while those who do badly on the standard task tend also to be slow in picking up the job. It appears, therefore, that we can estimate special aptitudes or predispositions towards picking up certain types of skill quickly and economically with some reliability and accuracy.

There is a limited number of such aptitudes which can be so measured. They include mechanical ability, verbal ability and quickness with numbers, the ability to perceive relationships in space, musical ability, and probably also certain kinds of manual and manipulative dexterity. Research on these is less advanced than on the measurement of general intelligence, but it has provided certain methods of ranking individuals along this additional series of scales.

THE MOTIVATIONAL PATTERN

We cannot be said to understand an individual until we have some idea of the sort of things he likes doing, the kind of aims he sets himself, and how persistently and successfully he follows up these aims. In other words, we must consider his motivation, and this is the next aspect of personality in which we shall find wide differences between people.

In the first part of Chapter VI we discussed human motivation and we saw how it differed from the rigid, specialized instinct-patterns of animals in being highly flexible and adaptable. Basically, human beings seek to furnish themselves with food, shelter, companionship, and a few other simple, elemental needs, but the environment in which they live and their own particular set of abilities, skills and habits combine to present them with a variety of different ways in which they can satisfy these primary urges. At the same time all kinds of intermediate goals will appear, as when young people who are basically seeking companionship and opportunities for marriage set themselves the immediate aim of becoming physically attractive and socially agreeable so that they will be accepted more easily among those with whom they wish to associate.

It is obvious from the start that this aspect of personality is much too complex for the differences between individuals to fall into any form of simple ranking. We cannot hope to reduce an individual's motivation to any form of score and to compare it with the average of a group of others as we can do with intelligence tests. Even the simplest motivational pattern is much too complex for such treatment and we must make some effort to understand it *as a pattern*, with all the different elements fitted into place in one coherent whole. This may sound difficult, and indeed it will require some effort of comprehension, but there are three lines of approach which will help to show the main threads running through the pattern.

The first of these concerns the direction of motivation, or the kinds of activity which an individual seems to seek out in preference to others. The second concerns the levels of achievement, the goals he sets himself and his degree of success in following them up. The third concerns the reality-content of the goals, or the degree to which they are capable of being achieved in real life. And in case the word "motivation" seems a little detached from ordinary life, we can consider these three points in terms of an individual's "interests."

The Direction of an Individual's Interests

When we consider an individual's interests both as expressed in the kinds of thing he chooses to do in his spare time and in the work activities which seem to give him most satisfaction, we shall, of course, find a considerable variety. Most of us do some things which bring us in contact with other people, and most of us have to do something practical or active. Many of us also have to do a certain amount of reading and writing or similar intellectual pursuits. The day is fortunately past when a man sat at his bench day in and day out with all his waking hours occupied by his work as a craftsman.

But while all these kinds of activity will be represented in most people's lives, there will probably be one or more which seem to occupy more time and attention than the others. For example, a man may occupy a minor supervisory job in which he gives out the work to a dozen others. When one talks to him about it he may tend to emphasize the importance of suiting each one's task to his particular level of skill and of trying to maintain a satisfactory team-spirit among the group by fostering good relationships and co-operative working. Suppose that in his spare time this man takes part in a number of local sports and social activities and seems in most cases to be put on the committee and to find great satisfaction in taking charge of an outing or running a party for the club; it would be obvious that in this case we have someone who finds his main satisfaction in doing things with other people, someone whose interests have a marked *social* trend.

When such an individual is contrasted with someone whose spare time is occupied entirely with solitary pursuits like fishing or stamp-collecting, and who seems neither to seek out nor find any pleasure in the society of others, either at work or in his leisure time, the difference between the two types of interest-pattern will become apparent. These differences will be found sufficiently frequently in ordinary life for us to lay down "interest in doing things with others" as one general direction in which people's preferred activities may lie. When we consider an individual, therefore, we may decide whether he is likely to be attracted by *social* or *non-social* pursuits.

Another general direction of preferred activities may be shown in a liking for *practical-constructive* pursuits. The traditional craftsman figure would illustrate this, for such a person gained great satisfaction from the exercise of his skill with tools and his ability to transform wood or metal into useful and beautiful objects. It is possible that a rather unreal halo of romance has gathered round the old-time craftsman who took a real pride in his work, but even at the present day it is quite clear that some people prefer such activities, even to the extent of devoting a good deal of their spare time to them. On the other hand, there are those to whom making things, working with their hands, is simply tedious.

Some people take great pleasure in the exercise of their physical powers; not only do they enjoy active games and open-air pursuits, but also they seek out work which takes them away from towns and involves some exposure and possibly hardship. This direction of interests might be called *physically-active* and on a more humdrum scale it can sometimes be seen among manual labourers, market porters and similar workers, some of whom seem to get a noticeable degree of satisfaction out of using their strength on day-to-day tasks.

Another group of satisfactions might be called *intellectual*. Those who become easily bored with a routine job may do so because it provides no problems for them to solve, and they might be happier if it gave them something on which to exercise their intelligence. To some extent probably everyone gets some satisfaction out of the use of his intellectual powers, but there are some people whose working life is taken up with planning or research, and whose spare time seems devoted to reading and study to such an extent that this becomes the main thread in their lives. We might add another category of *aesthetic* interests which would include satisfaction in the appearance and balance of things, but as we do not want to have an unmanageable number of classifications we had probably better stop at that.

Levels of Satisfaction

We now have four main directions of interest—social, practical-constructive, physically-active, and intellectual—and when we consider an individual we shall probably find that his motivational pattern shows quite a preponderance of one or more of these kinds of preferred activity. But suppose we have two people, both of whom seem to have a preference for doing things with other people. One of them spends several evenings a week in the local public house while on Saturday afternoons he attends a football match with his friends. The other is chairman of a local ex-servicemen's association, secretary of his works social club, and a committee member of the district youth club. Both of them spend a good deal of their spare time among other people but there is a marked difference in the use they make of their time and in the effect they have in the neighbourhood.

Such a difference can best be described in terms of the levels of goal and achievement which the two people set themselves. In the first case the individual has been quite content to be among others of a similar outlook, doing that which comes first to hand and showing few signs of self-direction or willingness to make much effort. In the second case the individual has obviously put much more into his spare-time life, has set himself the task of helping to run three local organizations, and his success in contributing to their development has been recognized by the offices he holds. The difference between the two motivational patterns is not so much one of direction as of strength, consistency, and the successful overcoming of difficulties.

Whenever we think of an individual's interest-pattern, therefore, we shall find that, in addition to the direction in which his preferred activities seem to tend, there is quite a characteristic level in the goals which he sets for himself, and in the degree of success which he achieves. Linked with this is the question of self-direction, for a few people seem to choose their own activities, set themselves high goals, and reach quite impressive levels of achievement. Others join in with anything which is easily available and which their companions are doing and seem quite content to potter along putting in the time and achieving nothing of any significance. Between these two extremes will be found all kinds of intermediate cases.

The Reality-content of Interests

Living as we do in a society with different habits and customs, each one of us normally fits into a certain background. This is important as we shall see in a moment or so, but for our present purposes, it has a bearing in determining the kinds of preferred activity we should expect to find any particular individual following up. A black-coated worker in the forties, living in a semi-detached villa in a suburban housing estate, would normally spend his spare time in his garden, doing a few odd jobs about the house or following up some hobby, with an occasional visit to the local cinema accompanied by his wife, and perhaps some participation in local church or political affairs or membership of a games, musical or other recreational association. These are the activities locally available which people of his own type go in for and there is room for quite high levels of achievement in them.

But when we find someone like this appearing frequently in a white tie and tails and competing at the local dance hall for the title of local rumba champion we shall probably say to ourselves "That's rather an odd thing for a man of that background to do in his spare time. I wonder what kind of satisfaction he gets out of it?" In such a case as this we might be tempted to think that the spectacle of his humdrum life and approaching middle age had become too much for him and he was trying to find some compensation for the glamour and achievement he had missed.

When we come across those elements in an interest-pattern which don't seem to fit into the general picture we begin to wonder if the individual is seeking his satisfactions in the real world or whether there is a certain element of unreality in his motivation. This is not to say that whenever we find anything unconventional we must leap to the conclusion that it is a retreat from reality—many unusual pursuits are rather evidence of strong motivation and self-direction. But when we find someone in whose life these phantasy achievements occupy a very large place, we are probably justified in thinking that the reality-content of his motivation is a little low.

CHARACTERISTIC REACTIONS OF AN INDIVIDUAL

When we were discussing emotion in Chapter VI, we noted that here again individuals might differ. We might find that certain situations call out no emotion in one person, a mildly pleasant emotion in another, and an acutely unpleasant emotion in a third. In regard to that one situation, indeed, it might be possible to rank a number of individuals along a scale with the acutely unpleasant emotions at one end, the acutely pleasant at the other, and the neutral emotions in between. This, however, would be of little practical use because life consists of a series of constantly changing situations, and to know how an individual's reaction to any one of them is related to that of other people is no more than a detail of a minor relevance. What we want to know is his characteristic reaction to situations, so that we may be able to estimate his probable emotional state when confronted with a new situation.

We must, in fact, turn from studying the reactions of a number of individuals to one situation, and consider instead the reactions of one individual to a number of situations.

Then we shall be able to see if there is any consistency in his reactions, or a characteristic pattern which we might expect to become apparent in the future. Is there any means by which we can learn anything about an individual's reaction to situations?

Emotional reactions are usually expressed in some form of behaviour. If we have a characteristic way of reacting to situations, the behaviour-patterns appropriate to that kind of behaviour will tend to become habitual to us. If angry reactions, for example, are characteristic to us, we may rather frequently be seen giving displays of bad temper and irritation, while if we are rather tender, sentimental people the appropriate gentleness and ingratiating behaviour may come to be characteristic of us.

Any habitual behaviour-pattern, however, cannot fail to have its effect on other people, who will take such steps as they think necessary to protect themselves. For example, a bad-tempered individual will fall into a characteristic role among other people, and that role will correspond very closely to his characteristic emotional state or reaction-pattern.

Think, for example, of someone who has never risen to any position of responsibility, who has never taken a very significant role among other people. We may find that no one takes him very seriously or considers him capable of standing on his own feet; this may be because he always appears uncertain of himself, lacking in self-confidence, and prone to worry about matters of little importance. These characteristic behaviour-patterns are probably due to the fact that he is constantly subject to the fearful, timid emotions and that he has very little control over them. His characteristic role among other people, then, shows his habitual state of mind remarkably clearly and accurately.

Not all cases fall into such a clear-cut pattern as this, but the fact will remain that only those whose characteristic behaviour, and hence their emotional state, is reasonably stable and well controlled will be able to undertake responsible and significant roles among other people. Those who show signs of isolation from their fellows or inability to take a constructive role in a social situation will very frequently be found to have ill-balanced and badly controlled dispositions. This gives us a simple but quite effective means of understanding the differences between people from this aspect of their personality.

CIRCUMSTANCES

Whatever innate characteristics we may start life with, the kind of person we are at the moment will depend to a large extent on the experiences we have passed through. Certain qualities may have developed with use while others have atrophied because they have never had scope for development. We shall have a very one-sided notion of an individual, therefore, if we neglect to consider the circumstances in which his life has been passed.

We may look at these from several points of view. In the first place, the people he has lived among cannot fail to have exerted a considerable influence over him. This is particularly so in childhood for it is already fairly clear that insecurity and lack of affection at home make it difficult for a child to develop the confidence in himself which successful adjustment to others depends on.

Secondly, his background will have accustomed him to expect certain things from life, certain standards of comfort in accommodation and certain levels of prestige among other people. If these are not forthcoming he will tend to be very much at a loss, and will be unhappy, uncertain of himself and ineffective in action. Thirdly, an individual's background will accustom him to certain standards of behaviour and conduct, and it is only when we know something of his circumstances that we shall be sure what to expect of him.

This is another aspect of the individual which cannot be reduced to simple rating but which must be comprehended as a whole. To some extent it may be helpful to think of him in terms of an average for the population, but the situation is much too complex for this to be of more than limited value.

PUTTING THE PICTURE TOGETHER

We started this chapter with a reasonably clear understanding of the variations between individuals in any one measurable characteristic, and we have been considering the more complex question of the number of scales of variation which could be laid down. It became quickly apparent that a very large number of these scales could be put forward, so many in fact that they would quickly become meaningless for practical purposes. As we went along, however, certain main aspects became apparent. In some of these we could rank the individual in terms of a normal distribution, while in others we had to be content with gaining a reasonably comprehensive descriptive assessment.

Recapitulating these aspects we shall find that they fall into the following seven points, which are useful as categories under which we can group our ideas about individual differences—

Physique, or that which concerns health and fitness, appearance and turnout, manner and speech, poise and confidence.

Attainments, or all that the individual has actually done in the past, such as his general education, specialist training, and work experience.

General Intelligence, which has been sufficiently considered in the previous chapter.

Special Aptitudes, or ability to pick up certain types of training —manual, mechanical, verbal, etc.

Interests, which give an indication of his motivational pattern, in terms of direction, achievement, and reality-content.

Disposition, or the organization of his emotions, shown by the characteristic role he tends to fall into among others.

Circumstances, or levels of expectation in terms of prestige, remuneration, and the like.

These headings form the Seven Point Plan, first developed by Professor Alec Rodger for use in vocational guidance work in the National Institute of Industrial Psychology. It has since proved relevant in industrial work and in the Armed Forces. Its use will be considered in the following chapters.

SUMMARY

1. How many different scales of variation can we think of among human beings?

An infinite number. Even in physical measurements we can rank individuals in too many dimensions to be either meaningful or useful. For practical purposes it is probably better to aim at getting a general description of an individual's physique than to collect a multiplicity of rankings.

2. How should we assess an individual in terms of physique?

By thinking of his general health and fitness, and his ability to stand up to heavy physical work without fatigue or breakdown. Next we consider his appearance, his dress, cleanliness and turn-out, and go on to his voice and speech, his manner, poise and confidence. These latter considerations will affect the first impression he makes on other people.

3. How do we sum up an individual's qualifications?

By thinking of his attainments in terms of (*a*) his general education, (*b*) his special training, and (*c*) his work experience. These are all matters of fact and can in most cases be expressed in terms of examination results, periods in different jobs, etc.

4. Can an individual's abilities be estimated with any accuracy?

Tests of general intelligence and of certain special aptitudes will rank an individual among a comparable group in terms of (*a*) his general mental ability and (*b*) the likelihood of his proving easy to train in certain kinds of skill.

5. How can we understand an individual's motivational pattern?

By considering his interests, or the kinds of thing he prefers doing, to the extent of following them up consistently and systematically. These will usually show one or more of the following directions—social, practical-constructive, physically-active, or intellectual. They will also show a characteristic level of achievement and reality-content, which can be related to the individual's abilities and opportunities.

6. Is it possible to predict an individual's characteristic reactions?

If we can understand an individual's emotional make-up we should have a fair idea of how he will react in the future. Emotions are shown in behaviour which, in turn, will affect the attitude of other people. If we can find out the characteristic role into which an individual falls among other people we should be able to understand something of the pattern of his emotional life.

7. Are the circumstances of an individual's past life important?

Very. Among other things, they influence his levels of expectation in regard to his income, the prestige of his work, and his place among other people. In more subtle ways also an individual's relations with other people in the past will affect his powers of adjustment.

8. In view of the many different scales along which individuals may vary, how is it possible to sum up anyone as a complete person?

By considering him in terms of the following seven categories—

Physique
Attainments
General Intelligence
Special Aptitudes
Interests
Disposition
Circumstances

In this way, by using ranking methods where they are applicable, and by building up a description where they are not, it becomes possible to understand an individual "in the round."

CHAPTER XI

VOCATIONAL GUIDANCE AND SELECTION

ONE of the practical problems in industry is that of getting the right person into the right job. It becomes very quickly apparent that some people are better suited for one type of work. They pick it up quickly, they do it well, and they find reasonable satisfaction in it. Other people on the same work may take a long time to train, they may never do it well, and they may feel continuously frustrated and irritated while they are on it. From the point of view both of efficient working and of individual satisfaction, therefore, it is advisable to avoid misplacements in work, and on this subject industry has a right to expect help from the psychologist.

Work on the subject has been in progress for a number of years, and while the problem is one and indivisible, it has tended to be approached in practice from two points of view. The first is that of the individual who wants to know which out of a number of jobs he is most likely to find success and satisfaction in. Most young people leaving school are in this position and the giving of advice to such individuals as to the course they should follow has come to be known as "Vocational Guidance." The other point of view is that of the firm which wishes to find the most suitable person to fill a particular vacancy. If a number of candidates present themselves the problem is one of picking out which will be most successful and satisfied in the job. This process has come to be known as "Vocational Selection."

While there is a difference in the two approaches, it is perhaps not quite so marked in practice as might appear at first glance. When conditions of full employment are the rule it is comparatively rare for a firm to be presented with a large number of candidates for a particular job, and it is not unusual for there to be a number of vacancies open at the same time. When an applicant appears, therefore, he will usually be considered not for one position only, but first for his general suitability for employment, and if he appears a useful person, then for a number of jobs in turn. In the same way, an individual is seldom in the position of being able to pick and choose among an unlimited number of jobs. Certain openings may be available, for each of which the standards may be more or less exacting. Among these he must make up his mind which offers the best opportunities from all the relevant aspects.

Something between guidance and selection, therefore, is often called for in practice, in order to make the best use of available man-power. "Allocation" might be the most suitable word to apply, and indeed it describes quite adequately what took place in the Royal Navy and the Army under the title of "selection." Men called up for National Service had to be sorted out into the most suitable appointments, only those who were completely unfitted for any employment whatever being rejected.

VARIATIONS IN JOBS AND INDIVIDUALS

We have already spent some time considering the differences between individuals and we have seen the bewildering picture they present. Not only do they vary along any one scale, there are many scales along which they can be ranked. No individual need occupy the same place on any two scales, so that each person must be considered as a complex jig-saw of attributes which can only be understood as a unique pattern.

But when we turn to consider the different ways in which people can earn a living the situation is no simpler. Each job demands its own kinds of skill or technique, some quite easy and obvious, some more abstruse and calling for a long period of practice. In some cases these will be manual skills, in others intellectual, and in others again they may be social skills. Each job will involve working with its own kind of material and will result in its own characteristic product. The daily duties, therefore, will vary from one job to another according to the kind of work it requires.

In addition to this, however, each job will be carried out in its own environment, among a particular set of people. British industry is carried on among a large number of small firms, each of which is a distinct social unit, with its own atmosphere and its own accepted standards of conduct.

We may find the same job carried out in two different companies and while the actual duties and skills involved may be exactly similar, the variations between one social environment and another make such a difference that we can no longer think of the two positions as being completely analogous. In one case, for example, pleasant relationships and an agreeable atmosphere at work may make no demands on the social skill of the individual concerned. In the other, low morale, poor co-operation, and strained relationships may present a task impossible to anyone whose ability to deal with other people is not of the very highest order.

Jobs differ too in the satisfactions they offer. Some may be well paid and full of material satisfactions, others may be poorly paid yet provide a strong feeling of social usefulness. Others, again, may hold glittering prospects for those who can measure up to the high standards they call for, while still others carry great prestige in the community, sometimes for reasons which are difficult to understand on a superficial examination.

We are confronted then with two variables, the job and the individual, both of which can differ widely in a complex fashion. Our task is to match up one with the other, to find the individual who will fit neatly into the job-situation or to find the job which will best suit the individual and provide him with the scope he requires. We can only succeed in doing this if we reduce our two variables to a common standard for comparison. How is such a standard to be found?

THE USE OF THE SEVEN POINT PLAN

What we require is a common framework of reference on which we can draw up the requirements of the job on the one hand and the attributes of the individual on the other. The first of these can be expressed in terms of human personality as well as the second, for we can best lay out the demands of the job in the form of a specification of the person who will do it satisfactorily. An adequate method of describing an individual will give us the common standard we require.

In the preceding chapter we have been considering personality and we have put forward seven points under which the variations between individuals can be grouped. These could be recapitulated briefly in the following terms—

1. *Physique*, including (*a*) health, strength and endurance, and (*b*) outward appearance, speech and manner.
2. *Attainments*, including (*a*) general education, (*b*) specialized training, and (*c*) vocational experience.
3. *General Intelligence* in the form of test results, considered against the individual's effective ability in real life.
4. *Special Aptitudes* expressed in similar terms.
5. *Interests* showing the direction of an individual's motivation, his level of goals and achievements, and their reality-content.
6. *Disposition* or the individual's characteristic reaction to situations shown by the kind of role he tends to assume among others.
7. *Circumstances* showing the individual's background and his levels of expectation in terms of remuneration and prestige in work.

This is the Seven Point Plan first devised several years ago by Professor Alec Rodger for use in the vocational guidance work of the National Institute of Industrial Psychology, and it provides the common framework of reference for which we are seeking. If we can describe the kind of person who is likely to do any particular job well in terms of these seven categories and if we can sum up an individual in the same terms, then we shall be in a position to compare one with another on the same basis. If they fit, we can predict that this individual is likely to be successful and satisfied in the job, while if they do not fit we must set about looking for another job or another candidate.

To reduce the requirements of a job and the attributes of an individual to this seven-point basis, however, requires a little study. On the one hand we must look at the job and consider the work it involves in order to assemble a basis of factual data on which we can build up a description of the kind of person who will do it well. This description we may call a *Job-specification*, and the process leading up to it a *Job-study*. On the other hand, we must assemble a basis of factual data about the individual on which we can build up a satisfactory *assessment* of his abilities and potentialities. The two processes have an essential similarity in that they both start with a study of the facts and proceed by logical inference from them, but this assembling of facts is not quite so simple as it might seem at first glance. Let us consider first the assembly of facts about a job.

JOB-STUDY

When we first go into a factory to look at a job we are likely to see someone working on a machine or with tools which are unfamiliar to us. There may be a certain amount of noise and movement which tends to distract our attention, and we shall hear strange words which we do not understand applied to the materials and processes in common use. In such a situation we shall find it difficult to understand what is going on and if we stay for half an hour or so to study the job we may carry away a misleading impression partly because what we have seen in that limited time may not be typical of the work involved and partly because we may have failed to relate it adequately to the larger picture.

But if, conscious of these dangers and limitations, we apply for help to someone who is in daily contact with the work, we may not be much better off. Such a person may be so familiar with what is going on that he takes for granted many important details which are not immediately obvious to the outside visitor. For example, it frequently happens that on automatic machine-work the operator has no formal responsibility for mechanical adjustment and maintenance, this being under the control of specialists who have had suitable training and experience. But in practice it frequently happens that the difference between a good operator and a slow one is determined by the amount of mechanical trouble which the latter encounters while the former seems to manage long runs with only a very occasional stop for adjustment. Why should this be so? Usually because the better operator has more mechanical sense and, noticing the need for attention before serious trouble develops, can call the mechanic and point out the incipient defect. The difference between the two, therefore, may largely be a difference in the mechanical care they take of their machines, for which officially neither has any responsibility.

Those who are in contact with the work-situation usually have some responsibility for production and discipline, and they naturally think of operators from that point of view. If one is insolent or critical of authority he will be considered an unsatisfactory worker and his level of output, though it may be well above average, will be lost sight of. In the same way, those aspects of the job to which the supervisor's attention is normally called, such as the variations in quality or failure to conform to working instructions, will be considered of disproportionate importance. The same can be said for the dangerous parts of a job or those requiring assistance. A foreman who in the preceding week has had to cope with a serious accident, several mistakes which have led to a heavy proportion of rejects, and the provision of assistance in the manipulation of heavy objects, will have a totally different view of a job from one whose section has been running smoothly and uneventfully for the last month.

Many of the working methods and much of the training in British industry at the present day are still largely rule-of-thumb. One result of this is that traditional legends have grown up with the years which are accepted on a wide scale though they have little real foundation in fact. In some trades, for example, great prestige still attaches to the workman who superintends, say, a melting process and is supposed to decide by spitting into the mixture at the appropriate moment just when it is ready to run off. His knowledge and experience are of great importance in the daily working of the plant, but in many cases the actual control of the process has passed over to the laboratory and the decisions are in fact taken by a young man with a science degree. Such a change, however, is not understood in its full implications, and those in contact with the work would be very unwilling to admit that four years at a University could possibly lead to a better understanding of the process than twenty years on the floor of the shop. The accounts of a job given by those most directly in contact with it are frequently liable to be coloured by these traditionally accepted conventions which are becoming less and less realistic as industrial processes are brought up to date.

The Need for an Effective Method

To acquire an adequate basis of information about a job, therefore, we must devise a method of studying it which will avoid these pitfalls. This is, in part, a matter of a systematic approach so that all the details which concern one aspect are considered at the same time, and partly a matter of substituting objective facts properly observed for the opinions of those who are supposed to know, but in fact do not. For example, if we have a job which is supposed to involve "heavy work" it is advisable to find out what weights, in pounds, have actually to be lifted, how often, and with what mechanical aids. When this is done it may become apparent that while an object weighing as much as a hundredweight has to be lifted, this only happens on an average once during the working day and that there is always a block and tackle available with someone else to give a hand. The physical strain involved in such an operation may actually be negligible. When such factual information is assembled we can be sure that we know what we are talking about and that all the relevant facts are being considered.

When one thinks of a job-study in this manner it is surprising how much becomes susceptible to measurement. The physical strain of work can in many cases be expressed in the number of pounds weight to be lifted and the frequency with which this occurs. Exposure to heat can be expressed in degrees of temperature at the working point, and other trying conditions, such as humidity, fumes, poor light or the exposure to danger, can be expressed objectively in the appropriate units of measurement, or in terms of the frequency of accidents reported over a period. In the same way, the monotony or boredom involved in many types of work can be expressed in terms of the job-cycle and the number of changes of model in the working day. A job-cycle of ten seconds, such as would be involved in a very simple assembly operation, with only one change of model every three days, would be a very monotonous and routine kind of task, especially when compared with one where the job-cycle was three hours and a change of model occurred every day.

Collecting information of this nature may take time and may involve a special study; one must not overlook the fact, however, that a certain amount may already exist in production or wage records which only requires collating to be immediately available. Wherever possible, such records should be used, in intelligent relation to actual observation of the work, for it is only upon such a basis that we will ever know accurately what a job really involves.

A Systematic Approach

The information we require about a job can be conveniently arranged under the following four headings—

LIST OF DUTIES. This will comprise a straightforward description of the actual work involved. In a simple job it can be quite detailed and show the actual movements involved in each phase of the work. Such a minute account will not usually be necessary, however, and a more general statement may be of more practical use. In each case someone must decide the degree of detail which should be gone into, but it will usually be quite a safe guide to keep the statement as simple as possible. Under this heading all the devices mentioned in the foregoing section should be used to give objectivity to the description.

TRAINING AND SKILL REQUIRED. Before an operator can undertake a job he must be trained, and in some cases his failure to do the work is in actual fact a failure in training. It is advisable, therefore, to deal in some detail with the knowledge and skill he must acquire before he can be considered fully proficient. Two categories will be found useful, one of which includes the qualifications he must have acquired before he begins, the other dealing with the training he must undergo on the job. The length and nature of normal training should be considered and where possible actual standards of proficiency should be quoted. It will also be useful here to deal with the kinds of difficulty which trainees encounter and also with the usual causes of failure. These latter can be most revealing in showing the kinds of people who find the work most difficult.

WORKING CONDITIONS. We turn next to the place in which the work is done and describe it under the appropriate headings. These will include whether it is indoor or outdoor, its heating, lighting and ventilation, and whether it is unpleasant through fumes, damp, heat, dirt, noise and the like. We should also note whether the worker works alone or in company with others, whether the social unit is large or small, and what kind of relationships prevail within it.

Economic Conditions. Few things are more important about a job than the remuneration it offers, for that will determine its occupant's standard of living and probably also that of his wife and family. We must, therefore, have a clear idea of the wage or salary attached to the job we are studying and anything else, such as the incidence of overtime, paid holidays, sickness benefits or the like which determine the total material benefits an employee will draw from it. It is important to remember that the total income matters more than the actual rate of wages; consequently a job with a high hourly rate where employment is irregular and intermittent may be less remunerative in the long run than one with a lower rate, regular employment, and a certain proportion of overtime each week.

JOB-SPECIFICATION

Once we have drawn up a complete and realistic description of a job we can work out from it a specification of the kind of person who is likely to do it satisfactorily. It is very important that this specification should be operational, that is to say, each quality laid down in it should be linked with some aspect of the actual duties shown in the job-description and should be set out in terms of those duties. Under the heading of physique, for example, it is rather meaningless to say merely that the successful candidate should be "of good appearance, speech, and manner." If we were drawing up a specification for the job of a dentist's receptionist, for example, it would be much more satisfactory to say that "her appearance, speech, and manner must be such that she will create a reassuring impression on patients, many of whom will be in a state of apprehension or possibly even in pain." If all aspects of the job-specification are expressed thus in operational terms they will be more convincing and accurate and will be much easier to work from.

The job-description gives an account of a job-situation and should be drawn up under the headings shown in the preceding section. The job-specification is a description of a person and should be drawn up under the seven points mentioned earlier in the chapter. It may be advisable to show the relative importance of various standards, and columns such as the following may in some cases be found helpful—

PHYSIQUE

Essential	*Desirable*	*Contra-indications*
Able to stand up to outdoor work and carry weights up to 56 lb throughout a large part of the day.	A standard of physical resilience and robustness which will enable him to stand up to exertion and inclement weather without fatigue or risk of absence through sickness.	Any tendency to ill-health or any disability which would limit the free use of the limbs.

The remaining six points can be similarly dealt with. This should result in a clear and objective specification of the kind of person required to do the job, each item being related to some definite element in the work-situation.

SUMMARY

1. What do vocational guidance and vocational selection consist of?

Vocational guidance is the advising of an individual about which of a number of jobs he is most likely to be successful and satisfied in. Vocational selection is the picking out of the individual who is most likely to be successful and satisfied in one particular job. In practice a half-way stage between the two, which might be termed allocation, is frequently necessary.

2. What are the essential principles on which proper matching of jobs and individuals must be founded?

Individuals differ widely in their attributes and jobs are equally varied and diverse. Only if the two sets of variations can be reduced to a common standard is it possible to match one with the other. The Seven Point Plan provides a series of categories by means of which the kind of person required to do the job can be specified on the one hand, and the individual applicant summed up on the other. On this common framework of reference the matching-up process can be approached systematically.

3. What is the aim of a job-study and what difficulties are likely to be encountered?

Only a thorough study of the job can provide the basis on which an operational job-specification can be built up. But unless the person who makes the study is familiar with the job and its setting he is likely to miss essential elements. Those who are in daily contact with the job, on the other hand, are probably so familiar with it that they may overlook important points. Moreover, what seems most important to the immediate supervisor may be less so when the total picture is considered.

4. How should a job-study be approached?

The job should be observed directly and as much factual information about it as possible should be assembled. An attempt should be made to obtain this in quantitative terms either by inquiry from those in contact with the job or from records. The information should then be arranged under the following headings—

(*a*) List of duties
(*b*) Training and skill required
(*c*) Working conditions
(*d*) Economic conditions

5. How is the job-specification related to the job-study?

The job-study provides a complete factual description of the job and the conditions in which it is carried out. From this it is possible to work out a specification of the person who will be best fitted to do it well. This specification will be in terms of the seven categories already described, each characteristic being shown to be necessary by the actual circumstances of the job as made clear in the job-study.

CHAPTER XII

INTERVIEWING

In the last chapter we have considered how to match up jobs and individuals by expressing both the demands of the job and the attributes of the candidate in terms of the Seven Point Plan. We have also thought about the method of studying a job and drawing up a description of it from which we can work out a seven-point specification of the kind of person who will do it well. We have not yet dealt with the method of summing up an individual in the same terms and it is to this that we must now turn.

How do we in fact get to know an individual, or come to understand someone with whom we have been acquainted for some time? Usually by seeing him so frequently that we come to know how he tends to deal with the various situations he encounters in life. We are in fact so familiar with his behaviour that we have had many opportunities of seeing the repetitions and regularities in it. With a friend of long standing, therefore, when someone tells us of something he has done, we can say with perfect justice "How like old so-and-so. That is exactly what he *would* do." With a stranger, on the other hand, we are often at a loss because we have not had enough experience of his characteristic behaviour to be able to know with any confidence what to expect of him.

In assessing a candidate for employment purposes we are, in effect, presented with a complete stranger and asked to predict his probable behaviour in a particular job-situation. The only way we can do this with any confidence is by providing ourselves with a sample of his behaviour sufficiently characteristic to serve as a basis for inference about what he will do in the future. There are several ways of doing this: one, for example, is to put him in a carefully controlled standard situation where he is presented with a number of problems, the solution of which calls for mental work. This is in effect what an intelligence test amounts to, and we have already seen how the behaviour it calls for, when assessed in the form of an objective score, shows us with remarkable accuracy what to expect of him in the future when he is placed in situations which call for the solving of problems by seeing the relationships between their elements.

Many of the "tests" for particular kinds of job consisted in putting the candidate into a controlled situation which called forth the same abilities and attributes as the job and where performance could be scored objectively. These have on occasion proved to have a limited usefulness, but we want to know much more about an individual than his problem-solving behaviour; hence we must study him from many more points of view. We may meet him in an interview situation and by personal contact with him provide ourselves with more behaviour to observe. As this is an almost universal means of studying individuals for employment it is advisable to consider it for a moment and to think how far it serves the purpose which we have laid down above—that of providing us with characteristic behaviour.

THE AIMS OF THE INTERVIEW

Every word and action is to some extent characteristic of the individual from whom it comes. Thus, when someone comes into a room and says "Good morning" we shall learn something about him. If he goes on to talk about the weather and to give his views on the current political situation for twenty minutes or so, we shall learn more, while if he continues for half an hour and talks about business prospects as well we shall learn still more. But there is always the chance that the behaviour we have seen during this short period may be uncharacteristic of the person we are talking to. For example, a self-centred and irritable person can usually summon up enough surface affability to smile and say "Good morning." He can even make an effort to talk agreeably for half an hour if he judges it to be in his interest to make a good impression on his interlocutor. But one can imagine him leaving the interview and saying to himself, "Well, I managed to put myself across all right to that chap. Now that I've got what I wanted I can relax. There's no need to try to ingratiate myself any more."

Behaviour observed over a short period, therefore, may be uncharacteristic, and this is a serious danger when we have to make up our mind about someone during an interview of half an hour or less. Is there a way of ensuring that the behaviour presented to us during this short period will be more characteristic? Fortunately there is, because while the actual interview may only last half an hour, we can use it as a means of looking at twenty or thirty years of behaviour much of which cannot avoid being highly characteristic of the individual. The aim of the interview, therefore, should be to elicit the candidate's life-history, or as much of it as can be got out in the time available. Though it may be learnt at second hand, and though it can be no more than a survey, it is the best means of supplementing the behaviour which can be observed directly in face-to-face contact, by relevant and characteristic material.

We must, of course, get at the facts of the life-history, for vague generalizations about having worked here or there will be of little real use. We want to know in detail where the individual has worked, what were his actual duties and responsibilities, how long he remained, and under what circumstances he left. Once we are in possession of the facts we can build up a fairly accurate picture of what an individual has made of his life, where he has started from, and what use he has made of his opportunities. Provided it is factual and sufficiently detailed, such a case-history is the best source of characteristic behaviour we can have.

RELEVANCE OF THE CASE-HISTORY

Why should this be so? Partly because we play a very large part in making our own lives and partly because we are to a great extent the product of the environment in which we live.

To take the former point: in most of the situations in life we can choose, within broad limits, how we shall behave. We can, if we care, be helpful and co-operative, doing the tasks assigned to us effectively and with good grace and showing a sense of responsibility for what goes on, over and above the actual details entrusted to us. If we set about the situation in this way it is probable that we may be invited to assume more responsibility, that we shall remain for a considerable time in that working unit, and that we shall improve our position within it. On the other hand, we can choose to be unhelpful and irresponsible, doing the minimum necessary to complete the tasks actually assigned to us and showing no interest whatsoever in the larger aims and purposes of the job. This approach to the situation is unlikely to result in our being entrusted with positions of responsibility, and may cause us to be among the first to be dropped should there be any slackening of activity. By the final results, therefore, we may get some idea of how an individual has gone about such a situation.

But while it is true in a sense that we can choose how we shall behave in any particular situation, most people seem in fact to make the same choice every time. If in one situation they choose to be helpful and constructive, then within broad limits they will be helpful and constructive in another. This seems to be the behaviour that comes naturally to them and it will tend to show itself in their life-history by a series of characteristic patterns in the various situations in which they have found themselves. When we find an individual whose life-history shows that in every situation where he has been placed he has been on good terms with his associates and has been entrusted with responsibility, we can be sure that he in each case chose to be helpful and constructive and that this is in fact his characteristic behaviour-pattern. When, on the other hand, we find an individual who seems uniformly to have been on unsatisfactory terms with his associates, who has never risen to any position of trust, and who has always been the first to leave during a reorganization, then we can be certain, if the pattern has been repeated often enough, that an unhelpful and unconstructive type of behaviour is characteristic of him.

The Effect of Environment

Turning now to the influence of environment on an individual, it is common knowledge that people who have passed their lives in a particular type of community tend to possess certain mannerisms or conventions of dress and speech. Much of the comedy presented on the Variety stage depends for its point on the fact that Civil Servants tend to be unimaginative when presented with individual cases, that senior officers in the regular Services tend to reminisce about happenings in different parts of the world, and that cockney street traders tend to begin their sentences with words like "Blimey, Guv'nor." But there is rather more to it than these superficial mannerisms, for each community has its own standards of acceptable conduct, its own ways of looking at events, and its ideas of what is desirable and undesirable. Any one who spends a period in a community—and we must all live our lives in contact with others—will inevitably be affected by these common attitudes and standards; indeed he will be very strong-minded if he does not wholly accept them.

If we know, therefore, that an individual has passed most of his life among people whose standards of conduct were exacting and who maintained a code of values which was rather moral than material, then we should think it probable that his own standards and attitudes would make him trustworthy and reliable. If, on the other hand, we know that someone has lived for a long time among criminals and others who looked upon any moral scruples as a sign of weakness, then we should probably be justified in expecting that he would have some anti-social traits.

Environment can also exert an even more subtle influence on the individual, particularly in childhood and youth. We all depend to a greater or less extent on the approval of our associates for self-confidence and assurance, and we can only blossom out when we are surrounded by a certain atmosphere of encouragement. If we are conscious that those about us are disparaging our achievements and that they are taking every opportunity to criticize and belittle us, then it is highly probable that we shall feel lonely and insecure. Such a feeling will be very likely to result in aggressive and challenging behaviour, for we shall want to show the others—and ourselves—that we don't care a damn what they think of us. Reassurance and encouragement at home and in school are an emotional necessity to young people, and later they are no less necessary at work and in the other situations of adult life. If an individual has lived in an environment where these qualities abound he will have a chance of developing a reasonable degree of confidence in himself. But if he has lived only in "tough" environments, he is likely to be a fairly tough character and to seize every opportunity of proving to other people—and to himself—how very tough he is.

HOW TO ELICIT A CASE-HISTORY

If we accept the fact that a candidate's characteristic behaviour gives us the best clue to his personal qualities, and if we agree that the best way to provide ourselves with an account of the candidate's characteristic behaviour is to use the interview to draw out his life-history, then the main problem in interviewing becomes clear. What we are setting out to do is to get a full and detailed picture of the candidate's background in the time, necessarily limited, during which we are in personal contact with him. This is not always easy, but it can usually be done, provided we pay attention to two things: the first of these is a systematic approach, and the second concerns our handling of the conversation during the interview.

An individual's life-history can easily present a confused and rambling appearance if we think of it merely as a series of disconnected events, but if we try to consider it under an adequate series of categories it will probably fall into order and become reasonably coherent. The following seven phases will cover most people's lives quite satisfactorily for our purposes.

Home and Family Background in Childhood

It is advisable to know where people started from, for only then can we evaluate their achievements. Gaining a higher education from a home in a back street requires more brains and determination than merely going to the university from a wealthy and cultured family environment. We want to know, therefore, the kind of opportunities presented by an individual's home circumstances and what the family tradition of education and employment has been. We also want to know something about the security of the home in the emotional as well as in the economic sense. Any breakdown in the family either through death or separation of the parents almost inevitably shatters the sure background of affection and stability which is so necessary for the developing personality. It is no coincidence that so many young people who find adjustment to normal life beyond them and turn to crime or other anti-social behaviour come from broken homes.

School Life

The home background is mainly important for its effect on the individual, but at school the young person has his first opportunity of showing what he can do when he finds himself among others on level terms. A satisfactory school provides a wide range of activities and should encourage the young person to do the best he can in as many of them as possible. If we find therefore that someone has done well in school work as shown by his place in class or by his results in examinations, that he has taken a distinguished part in school games and other activities outside the classroom, and that he has been selected for such offices as prefect or head of the school, then we can be sure that in comparison with his fellows he has been well above average. These achievements will in turn provide us with evidence about his personal qualities, for no one could reach them without being reasonably intelligent and hard-working and giving the impression of being a responsible and reliable member of the school community.

It does not invariably follow that those who have done badly at school lack the qualities mentioned above, for there are individuals who fail to adjust to the school situation and only do themselves justice when they reach the adult world outside. These, however, are likely to be exceptions and we may take it that in most cases an undistinguished record at school is evidence either of low ability, indifferent personal qualities, or a failure to adjust to the conditions and personalities in the school environment.

Further Education and Specialist Training

An increasing number of people continue their education beyond school or spend a period on some form of specialist training. This again provides opportunities for achievement and if in addition to the actual qualifications we can find out what part a person has taken in the social life of a technical college or university or whether he has passed through the course more quickly and with better marks than the average, then we shall have further valuable evidence about the personal qualities the individual has shown in that particular environment.

Work History

Few activities are more significant in the life of the individual than his work, for most of us spend more of our waking hours at work than in any other pursuit. If therefore we can provide ourselves with a complete record of the jobs an individual has held, how long he has been in each, and what were his actual duties and levels of responsibility, we shall have a very illuminating record of important behaviour. In some cases we may see obvious evidence of good adjustment to other people, increasing levels of responsibility, and steady and sustained progress. It will not be difficult, therefore, to gain an impression of very sound personal qualities. In other cases we may see a record of failure, short periods in jobs, decreasing levels of responsibility, and a series of rows with people. Again the personal qualities which have made themselves felt in this sorry history will not be difficult to understand.

Service Life

In a world where major wars seem to occur with depressing regularity, a number of people spend a period of their lives in the armed forces. Wasteful in many ways as this undoubtedly is, it does provide the individual with a new environment and a different set of opportunities to show what he can do. Under present-day conditions the services probably make it easier for anyone with ability and determination to rise to a position of responsibility than any other comparable organization. This phase of the case-history, therefore, can provide useful additional information, which may either fill out the picture gained from normal civilian life, or may, by its contrasts, draw attention to qualities which might otherwise not have made themselves apparent.

Spare-time Life

The pressure of earning a living restricts the freedom of action of most individuals during working hours, and the majority have to do what is required of them rather than what they would prefer for large parts of the day. During their leisure time, however, most people can to a great extent follow their own inclinations, and the kind of pursuits an individual chooses, the levels of achievement he sets for himself, and the relation of these to his abilities and opportunities are quite a significant element in the case-history.

Present Circumstances

To round off the picture we should know how the individual is living at the moment, what family responsibilities he has undertaken, and what he requires to keep up his present style of life. Not only will this be important from the point of view of the kind of job he will be suitable for, it will also provide a comparison with the circumstances from which he started.

THE RELATION OF CASE-HISTORY TO ASSESSMENT

Once an individual's life-history has been covered in these seven phases, we should have a fairly complete picture of him. This will provide a record of enough significant behaviour to form the basis for an assessment on the seven points of the plan. Some of these will simply be a matter of arranging the information we have gained, such as Attainments and Circumstances. Others may require a little interpretation.

This interpretation should present no insuperable problems. To assemble the information available about an individual's health record and to relate that to our direct impression of his appearance and manner is fairly straightforward and will provide us with the Physique heading of the assessment. General Intelligence and Special Aptitudes can be summed up in test scores, while the effectiveness of these qualities in real life should be apparent from the case-history. The motivational pattern should be fairly clear, in direction, level, and reality-content, as also the characteristic role into which the individual tends to fall in the various phases of his life.

When a factual case-history has been patiently assembled about an individual it is usually surprising to find what a clear and consistent picture it presents and how easy it is to draw a logical and convincing assessment from it. Human beings run very true to form, both in the different aspects of their life at any one time and in the different periods and the environments in which they have lived.

A similarity must be noted here between the assessment process and that of drawing up a job-specification. Both start with a basis of factual information, the former about the job in the job-study and the latter about the individual in the case-history. Both proceed to interpret this information in terms of the Seven Point Plan, ending up with a specification on the one hand and an assessment on the other. It is upon this similarity of method and of result that systematic selection must be based.

HANDLING THE INTERVIEW

Now that we are clear about the aim of the interview, which is to provide a case-history of the candidate, we may turn to the method. It may seem a tall order to expect a candidate to tell you the story of his life during the time, usually quite short, which is available for the interview. Once a candidate is convinced that he has an interested and sympathetic listener, however, it is surprising how communicative he can become.

Conducting an interview depends essentially on two things. The first is the establishment of a relationship with the candidate which encourages him to talk freely, frankly, and confidently about himself. This cannot be done if the interviewer obtrudes his personality into the situation or uses the interview as an opportunity to show what a busy and important person he is. Nor can it be done by a series of standard formulas for "putting the candidate at his ease," such as shaking hands, or offering a cigarette, and the like. Each interview is a unique situation and the interviewer's attention must be fully absorbed by the candidate, encouraging every movement towards confidence and the forgetting of the strangeness of the situation, and counteracting so far as possible the feeling of being under examination.

The second element in the situation is to steer the candidate over the ground to be covered so that the essential facts appear as quickly as possible and the irrelevancies are cut down to a minimum. This depends on conversational dexterity, each remark guiding the candidate to talk about the right things without interrupting his flow of conversation. Every interview is first and foremost a conversation, and unless it is successful as such it will never be a good interview. Whenever an interview degenerates into a cross-examination it has been a failure, for such interrogations take an unconscionably long time, while they also tend to miss many of the important points.

Some people with a naturally sympathetic manner and a deftness in conversation can become good interviewers with a minimum of instruction. A few people are so insensitive to the reactions of others and so inept in their handling of social situations that they can never learn to conduct an interview. Between these extremes, however, most people by using a little tact and common sense can learn to handle most interview situations so that they gain quite an adequate case-history in a surprisingly short time.

SUMMARY

1. How do we in fact learn enough about another person to be able to predict his future behaviour?

We can only predict what will happen in the future by finding out the main lines of development in the past. When we know someone so well that we have learned how he behaves in a large number of situations, the main tendencies and reaction-patterns will be quite clear and comprehensible. It is then possible to say with some confidence how he is likely to react to some specific situation in the future.

2. How can we sum up an individual in an interview?

We shall see a certain amount of his behaviour directly during the actual period of the interview, but this is likely to be too short to be fully reliable. We can, however, supplement this by encouraging the candidate to tell us about a much longer period of significant behaviour in his past life. This should enable us to see the main behaviour-patterns quite clearly.

3. How far is an individual's past life a reliable source of information about his personal qualities?

In the first place an individual's personal qualities play a large part in determining his level of achievement and the part he will play among other people. Broadly speaking, in the long term, most people make the circumstances of their own lives by the kind of people they are. In the second place, the kind of environment we live in has a hand in determining the standards we try to live up to, the opportunities we are presented with, and our powers of adjustment to other people. Though these two points of view may seem superficially contradictory, nevertheless from either one of them the case-history is the most important source of evidence about an individual's personal qualities.

4. How can we elicit an adequate case-history during the short period of a normal interview?

It will help if we think of an individual's life in the following seven phases—

(*a*) home background in childhood;
(*b*) school life;
(*c*) further education or special training;
(*d*) work history;
(*e*) service life (if any);
(*f*) spare-time life, and
(*g*) present circumstances.

The main points under each of these phases can then be elicited to show how far the individual has been affected by it or how far he has shown his personal qualities in it.

5. What is the relevance of the case-history to the assessment?

The case-history provides the factual information on which the seven-point assessment is built up. Some of the points, such as Attainments, can be got by a mere assembly or arrangement of the information available, while some will involve a little interpretation, such as the working out of the motivational patterns to give the Interests heading.

6. What are the main elements in the handling of the interview?

To gain the case-history as quickly and comprehensibly as possible it is essential that the candidate should be talking freely, frankly, and confidently. This depends on the interviewer building up the right relationship quickly with the candidate and taking him deftly over the ground so that he provides the information required.

CHAPTER XIII

THE PENTAGONAL PEG AND THE FIVE-SIDED HOLE—AN ALTERNATIVE METHOD

Since the foregoing was written, an alternative method has been devised for setting out the demands of a job and the attributes of an individual. Its essential differences from what has been described above are that only five headings instead of seven are required for the classification of human attributes. Under each heading also, a scale, based on the Normal Curve of Distribution, is used to set out the different levels which will be found in the population. This method has been used for some years in the training of interviewers in the Department of Industrial Administration in the College of Advanced Technology in Birmingham and it has also been applied in a number of industrial companies. As will be seen, it has achieved a certain success in overcoming the two principal limitations of the interview as a method of allocation. These are, in the first place, low *reliability*, in the sense that different interviewers assessing the same individual do not reach the same conclusion about him. The second limitation is low *validity*, in the sense that the assessments reached as the result of interviews do not provide an accurate prediction of the individual's future performance on a job. Both these limitations arise from the lack of a properly defined series of categories and standards with which to describe the different aspects of human personality.

This method which has been described as the "Five Fold Grading," or, more recently, the "Pentagonal Peg and the Five-sided Hole," consists of the steps set out below.

First Impression and Physical Make-up

The first of the five categories covers not only the individual's physique, his health and bodily strength, but also the kind of initial impression he makes upon other people. There are two reasons for singling this out and focusing attention on it, one of which is that in an increasing number of jobs it can play an important part in determining success or failure. In an advanced industrial community the proportion of service jobs increases substantially, and in any post which involves contact with the public this aspect of an individual is important. To be greeted in an off-hand manner by a scruffy, unkempt member of the staff, who cannot return a civil answer to a reasonable request for information, is an experience which does not enhance one's confidence in the shop, transport undertaking or service organization one may be dealing with. Thus the First Impression—the dress, turnout, speech and manner of applicants for such posts—is of first importance. But the second reason for calling special attention to these characteristics is that they have a much greater influence than we realize on our opinion of another person. Without special training, few people can make a detailed and objective assessment of the different aspects of another individual. They usually end up with a kind of generalized impression that he is "a good bloke" or that "there's something I don't like about him." This "halo" effect is often found on examination to have been influenced out of all proportion by some quite minor and superficial characteristic or mannerism. It therefore helps towards an objective assessment if we look quite coldly and impartially at these characteristics of an individual and make up our minds about them before considering other aspects of his personality.

The question arises, however, of whether we can move what is normally an entirely subjective reaction to an individual's appearance, speech and manner, towards an assessment which has some claim to be considered objective. Several studies of interview assessments suggest that this is difficult, if not impossible, but some of the work carried out in the College of Advanced Technology in Birmingham is more encouraging. The problem is basically one of standards, and here the Normal Curve of Distribution, to which most differences conform, comes in useful. If we can take the average or "central tendency" of this curve and try to make it as clear and precise as possible in our minds, then we have a reference point from which we can "measure" up and down the scale. It has been found helpful to introduce the idea of a pendulum to represent this average, hanging in the middle of a 20-point scale along the abscissa of the curve. To move this pendulum upwards or downwards along the scale from its point of rest requires increasing amounts of evidence on the characteristic we are considering.

Returning to the First Impression of the individual, observation up and down the country should enable one to build up a reasonably clear and precise idea of the average for this characteristic. So long as we disregard people who are dressed for work or for some special activity, we shall recognize a high degree of conformity in the turnout, particularly of adult males.

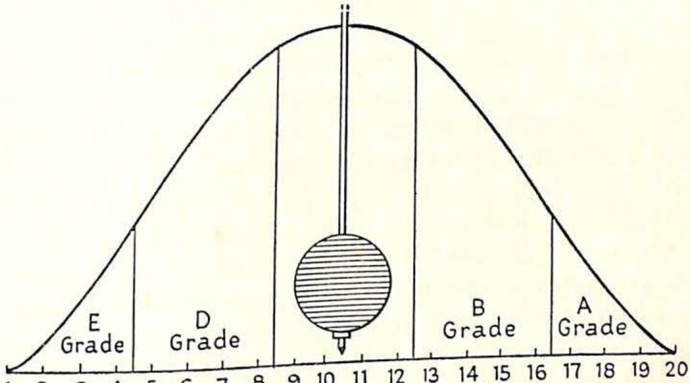

FIG. 20. "THE PENDULUM GIMMICK"

Similarly, the degree of local accent, the grammatical accuracy, the competence in self-expression, the self-confidence of the average person, conform to a fairly definite level which can be recognized once one turns one's attention to these characteristics and tries to observe them objectively. This "average person" provides us with our standard. Once an individual begins to show greater care in his dress and turnout, once his powers of self-expression begin to improve, once he begins to acquire more self-confidence and to be able to move with ease among a wider range of groups, then the pendulum starts to notch upwards along the scale. In the same way, evidence of lack of care in dress and turnout, the kind of local accent which interferes with comprehension, a rough, off-hand manner and the inability to deal competently with situations involving other people, will carry the pendulum notch by notch downwards. At the extremes of the scale we find, on the one hand, A Grade 20. First class honours and major university prize. Has obviously been the outstanding student of his year.

19. First class honours, or good second class with other evidence of distinction.

18. Second class honours, division two, or the equivalent.

17. Third class honours or pass degree.

B Grade 16. Three subjects in G.C.E. at Advanced level, major school prizes, or other evidence of being the outstanding scholar of his year.

15. Two subjects in G.C.E. at Advanced Level.

14. Four or more subjects in G.C.E. at Ordinary level, including English Language and Mathematics.

13. Less than four subjects in G.C.E. at Ordinary level, or exemption from S.1 from a technical school.

C Grade 12. Top of highest class in the "A" stream of a secondary modern school, or other evidence of having done outstandingly well in such a school. Passing out of a technical school without having gained qualifications noted in the B grade, but with evidence of having been at least above the average.

11. Above average in highest class of the "A" stream in a secondary modern school.

10. Average in highest class in the "A" stream of a secondary modern school, or evidence of having done outstandingly well in the highest class of the "B" stream.

9. Below average in the "A" stream or above average in the "B" stream of a secondary modern school.

D Grade 8. Average in the "B" stream of a secondary modern school.

7. Signs of some achievement in the "C" stream of a secondary modern school, or other evidence of having done something with his schooling, however slender this may be.

6. From here downwards there is little or no evidence that the school has had any effect on the individual at all. Reading and writing are only just adequate to cope with the simplest tasks.

5. See above.

E Grade 4. This grade comprises the semi-literate, who cannot either read or write with any competence. In its lower levels there will be evidence of inability to cope with normal education, relegation to special schools and the like.

FIG. 21. DRAFT FOR A MORE ACCURATE SCALE FOR GENERAL EDUCATION

the charming, well-dressed man-of-the-world who deals successfully with any social situation, and on the other we find the tramp, dressed in rags, quite incapable of any form of self-expression and shunning the society of others because they find him rather a repulsive figure of fun.

If an individual's Physical Make-up—his health, fitness and ability to stand strain—is particularly important in a job, medical advice should be sought.

Qualifications

This second aspect of the individual covers not what he looks and sounds like, but what he knows, and under this heading there are certain points about which we can be quite clear and precise. General education, for example, or full-time education which is not specifically directed to any particular job or profession, is tied up with the school, college and university system of the country and the various levels can be expressed in examinations or certificates which are publicly recognized. A list of these is shown in Fig. 21, with the different standards related to the scale discussed above. There are difficulties here in the average and below-average levels, for in this country there is as yet no school-leaving examination available for pupils who leave the secondary modern schools at the statutory age of 15. Assessments in these cases have to be based on performance in class as elicited at the interview, and the unsatisfactoriness of this procedure is obvious. The proportions of each age group which gain the higher qualifications, such as "A" level G.C.E. or university degrees, do not correspond with the 10:20:40:20:10 percentage distribution mentioned previously. Whether this should call attention to the limited educational opportunities available in this country is a question we need not go into here.

Formal vocational training or specialized education with a particular kind of job in mind can also be expressed in terms of examination results and certificates. A scale for these is shown in Fig. 22, and while this should be treated with some reserve it has proved useful as a guide to this aspect of qualifications.

Working experience must usually be dealt with in detail, either from the point of view of the job-specification or the

20. Doctorate (D.Sc., Ph.D.) Special distinction at post-graduate level or in recognized professional institution.

19. Technological degree with first class honours. Post-graduate Master's degree, (M.Sc.). M.I.Mech.E. or Fellowship of recognized professional institution.

18. Technological degree with second class honours. Dip. Tech. with second class division one, or better. A.M.I.Mech.E. or similar level of membership of recognized professional institution.

17. Technological pass degree, or third class honours. Dip. Tech. below second class, division one Higher National Certificate with endorsements. Chartered Accountant. Membership of institution which involves at least one year's training of graduate level.

16. Higher National Certificate. Membership of institution which involves more than one year's training of undergraduate level, such as the Institute of Cost and Works Accountants, Chartered Institute of Secretaries, Institute of Personnel Management, Institute of Marketing and Sales Management, Office Management Association, British Institute of Management, etc.

15. Passed A.1 of H.N.C. Course. Teacher's Certificate, British Institute of Management, intermediate examination, etc.

14. Ordinary National Certificate. City & Guilds Final. Certificate involving two years or more serious part-time study, such as a Workshop Supervision Certificate granted by a College of Advanced Technology. State Registered Nurse, etc.

13. Passed S.2 of O.N.C. Course. City & Guilds Intermediate.

12. Two sessions at local technical college with no certificate of national standing. Speed of 50 typing and 120 words a minute shorthand. Longer courses for skilled workers run by machine-building companies.

11. One session at local technical college with no certificate. Speed of 35 typing and 80 words a minute shorthand. Short course for skilled workers run by machine-building companies.

10. No training outside of work.

FIG. 22. DRAFT FOR A SCALE FOR TECHNICAL EDUCATION

assessment of the individual, and few generalizations are possible. Where it is useful to express this in some kind of scale, however, we may take as our reference figure for the average a skilled welder, or perhaps a semi-skilled assembly worker used to a high tempo of work, earning the average wage as shown by the Ministry of Labour six-monthly index figure,[1] who has had some formal training either in the shape of a craft apprenticeship or a period in a works training centre. Upwards from this average will be the highly-skilled technician, the more responsible supervisory jobs, and the junior, middle and higher management positions, while below the average will come the lower grade of semi-skilled jobs, the unskilled labourers down to the sweeping and cleaning-up jobs.

Brains and Abilities

This next aspect covers everything that can be measured by test, and as these factors have already been discussed in some detail, no more need be said at this stage.

Motivation

This aspect of the individual's make-up has also been discussed, so that the reader should be clear as to the kind of personal qualities it covers. What has still to be considered is the scale by which an individual can be assessed from this point of view. This presents quite a serious problem, and there is a considerable risk of arbitrariness and superficiality in trying to impose a rigid scheme of classification on this subtle but nevertheless important aspect of human personality. Experience has shown, however, that this risk is worth taking, and that it can be minimized if, as before, we start with a clear idea of the average figure in the population. And the average figure from the motivational point of view is one whose use of his abilities and opportunities provides no evidence to push the pendulum either upwards or downwards from its point of rest.

We are, of course, presented with a complication here, for there are differences in the abilities of individuals and in the kind of opportunities with which their way of life presents them. But if we consider a particular individual's test scores on the one hand, and his life-history on the other, then we can usually deduce his motivation from his levels of achievement in relation to his abilities and his chances. This, of course, can only be illustrated by examples, so let us consider the following biographical case-history. The individual in question has a test score just on the average.

---

[1] In October, 1961, this was a fraction over £15 per week.

> *Home Background.* Father a fitter in a local engineering works; steady job. One elder brother. Brought up in a provincial industrial city. Mother at home. No signs of insecurity in the family.
>
> *School.* Secondary modern school to 15. Average place in top class of the "A" stream. Played football for class and house teams but not for school. Not a prefect.
>
> *Further Education.* Evening classes at local technical college for one session and a term or so. Passed internal college examinations in first year but did not sit for any of the City and Guilds or National Certificate examinations.
>
> *Work History.* Craft apprenticeship at father's firm for five years. Carried on for further two years as a fitter. Moved to another firm on better-paid assembly work and stayed for three years till redundancy hit the trade. Moved to another firm as a fitter and stayed one year; then back to assembly job where he has now been for three years.
>
> *Service Life.* Two years' National Service in R.E.M.E. as craftsman. No promotion.
>
> *Spare Time.* Runs motor cycle and side-car which he maintains himself. Some home decorating. Formerly played football occasionally for works team. Reads *Daily Mirror* and *News of the World.* Watches westerns and variety on T.V.
>
> *Present Circumstances.* Married with two children. Lives in a council flat.

In such a case, the opportunities presented by a secondary modern school, an apprenticeship, National Service, work and spare time are fairly obvious to anyone with an understanding of our present way of life. If we look for evidence of failure to make use of these opportunities, there is none. His performance in class corresponded to his ability as shown by test, no more and no less, and he took some part in school games; he attended evening classes for a year and a bit, which is what the average apprentice did at that time; he held jobs in the skilled category and his reasons for leaving seem normal; he was able to use his craft skill during his National Service and his spare-time pursuits are those of millions of others. There is nothing, therefore, that would justify us in pushing the pendulum downwards from its point of rest on the average. Is there anything to push it upwards? Can we say in any of the phases of his life that he put his abilities to particularly good use, that he took more than the normal advantage of his opportunities? Had he been near the top of his class at school or taken a prominent part in games or other activities, had he gained a City and Guilds Intermediate or an Ordinary National Certificate in his evening classes, had he progressed to a highly skilled or a supervisory job at work or gained promotion in the Army, the answer would have been yes. We could have pushed the pendulum two, three or even more notches upwards according to the weight of the evidence. As it is, there is nothing to suggest above-average motivation so we are left with a choice between swaying it fractionally upwards to 11 or fractionally downwards to 10, a one-point difference on this twenty-point scale having little or no significance.

This is an example of average motivation where the individual's achievements in relation to his abilities and opportunities provide no evidence either to push the pendulum upwards or downwards from its point of rest. Similar examples could be quoted of individuals of higher ability presented with wider opportunities, whose achievements, when thus considered, are no more or no less impressive, while cases could be quoted of sons of unskilled labourers, with test scores below the average, finishing up in semi-skilled jobs which also illustrate average motivation. This kind of assessment calls for some knowledge of the different kinds of life-pattern which will be encountered in our community. While it is not suggested that these are in any way standard, none the less there is a great deal in common between many of them. From each starting-point, whether it be comfortable middle class, stable artisan level or limited-income labouring grade, there is a fairly typical life-history showing what happens when the individual neither sets himself high targets nor allows opportunities to slip by, but shows average motivation throughout. On the other hand, it becomes very quickly obvious if the individual is moving upwards into a different way of life from his origins, or if he is slipping downwards among the failures and the hard-luck cases.

Adjustment

The fifth and last heading under which the personal qualities of an individual are considered covers the emotional side of his nature. Here again the main issues have been discussed in previous chapters, so that we can confine ourselves to the problem of how these characteristics manifest themselves in day-to-day life. Generally speaking, the individual's level of adjustment shows itself in the kind of part he plays among other people, or the social role into which he seems to fall most naturally and frequently. Adjustment can be thought of in straightforward terms as the capacity to stand up to emotional pressure, and one of the most consistent and inescapable sources of pressure is contact with other human beings, with their moods and feelings, their demands and their irrationalities. How far can the average person stand up to these pressures? This is a key question, for if we can provide a clear and definite answer to it we shall have our point of reference for this heading and we shall be able to "measure" up and down the scale from it.

The average person, from the adjustment point of view, may be thought of as one who can fit into the average group, neither rising to a leadership position in it nor becoming the "odd man out" by getting continually into disagreements with the others. This in turn raises the question of what is the average group, but without complicating the issue unduly we may think of this as existing on the floor of any factory, in any public bar, football match, works outing or similar situation. It is not particularly tightly organized nor well directed, being composed of average people with average motivation as described above. Thus, if we find an individual who played some games at school but did not rise to the First Eleven, who has been a member of a club for some time but has never risen to the position of committee member or secretary, who has worked for several years among other people but has never been appointed to charge-hand, supervisor or any position of added responsibility or leadership, then we are dealing with the person of average adjustment. Any evidence of having played a more important role in any of these groups, any appointments like captain, secretary, chairman, supervisor or the like, will push the pendulum upwards from its point of rest, while on the other hand, any suggestion that he has not fitted in with others, such as taking no part whatever in school games or activities outside the classroom, leaving a club in dudgeon with a story of unfair treatment, having been unjustly deprived of his "rights," or having changed his job rather too frequently, will constitute evidence to push the pendulum downwards from the average. The really depressing cases of drifters who have never spent more that a few weeks in any job, the anti-social characters with a record of crime and

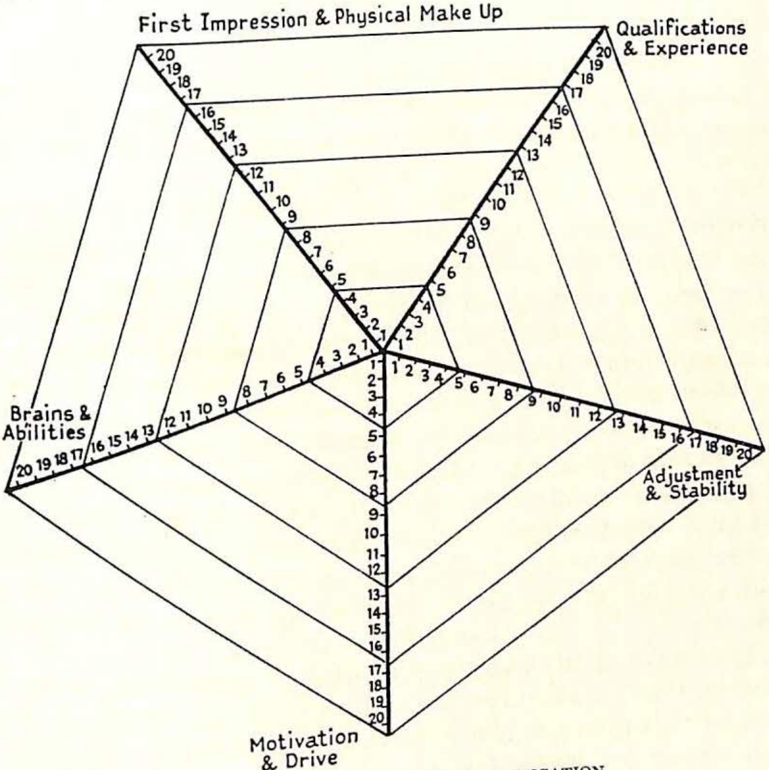

FIG. 23. ASSESSMENT OR JOB-SPECIFICATION

violence, or the emotionally disturbed whose "private worlds" abound with threatening enemies and lurking dangers, will come right at the lowest level, in the "E" grade or below the figure 4 on the scale.

The Pentagonal Peg

These five aspects of the individual and the scales on which they are assessed can be laid out as shown in Fig. 23. This can be utilized either to set out the job-specification, or the description of the kind of person required to do the job. It can also be used to set out the assessment of the individual.

AGREEMENT BETWEEN INTERVIEWERS

Experience in the training of interviewers throws some light on the reliability of interview assessments, or the degree to which two interviewers seeing the same candidate separately reach the same conclusion. Students have been trained to think in terms of the same average for the different qualities described above, and to collect their evidence from biographical case-histories drawn out during the interview. It is not to be expected that they will agree with each other every time. In view of the amount of information to be collected, the manner in which it is to be interpreted, and the difference in the ease with which a candidate will talk to each interviewer, it would be rather suspicious if exact agreement to the same figure on a twenty-point scale cropped up every time. This would suggest that the complexities of the individual personality were being squeezed ruthlessly into a framework of categories and that the assessment was, in fact, somewhat superficial. It has been found in practice, however, that agreement to within one point on the scale can be reached after a certain amount of training. This has accordingly been taken as the degree of accuracy of which the method is capable in day-to-day working. A recent study of seventeen "candidates" who were interviewed by pairs of students may be quoted in illustration. Each student saw the "candidate" quite separately and interviewed him biographically, assessing him for First Impression, Qualifications, Motivation and Adjustment. Test scores were supplied for the Brains and Abilities heading. A comparison of the pairs of assessments for the seventeen "candidates" showed the following levels of agreement—

> In twelve out of the seventeen cases, all the assessments were within one point of each other on the twenty-point scale.
>
> In two cases there was a two-point difference on one of the assessments.
>
> In one case there were two-point differences on three of the assessments.
>
> In two cases there were more than two-point differences on the assessments.

Thus in twelve out of the seventeen cases there was virtually complete agreement between the pairs of interviewers on all the four headings assessed, and in a further two there was a small difference, in one case on the Motivation assessment and in the other on Adjustment. Over eighty per cent of the pairs could therefore be considered as having reached either complete agreement on the assessment or something very close to it, after an interview lasting less than fifteen minutes. This seems to be the standard of reliability which can be attained by this method after a certain amount of training.

THE VALIDITY OF INTERVIEW ASSESSMENTS

To reach agreement between interview assessments, however, is to solve only one part of the problem. What matters in practice is whether these assessments are valid—whether, that is to say, they prove to be accurate predictions of the individual's future performance on the job. To investigate this, it is necessary to compare the assessments made by the interviewer before the candidate is taken on with a report on his progress after he has been on the job for a period. This may sound simple, but in practice it often raises problems about whether the report is an accurate estimate of the individual's performance on the job, or whether it merely signifies that he gets on well with his supervisor and his face fits in the department. So long as one realizes the limitations of such studies, however, they are useful indications of how far a method of selection has been successful in practice—how far, that is to say, the selector has placed someone in a job who is still there after a certain period and whom the supervisor thinks is "doing all right." Such a study was carried out in a Birmingham company in 1960–61 by Peter F. Rhodes, then a student in the College of Advanced Technology.[1] He interviewed all male applicants for weekly- or monthly-paid staff positions during a six-month period, and recorded his assessments. He followed up the thirty-nine who were subsequently appointed and obtained reports on their progress. When he compared these reports with his pre-engagement assessments, he found that—

> In twenty-eight of the thirty-nine cases, he had assessed them as suitable at his interview and they were being reported on as "satisfactory" or better in the job.
>
> In six of the thirty-nine cases, he had forecast certain weaknesses which were being referred to in the follow-up reports, though the individuals were still in their jobs.
>
> In two cases, assessed as suitable at the interview, the individuals were being reported on as doubtful, but were still in the jobs.
>
> One case, reported on as satisfactory, had left after two months, but during that time had been regarded as satisfactory in the job.
>
> In two cases, assessed as suitable at the interview, the individuals had been found unsatisfactory in the job and had been dismissed.

Thus the predictions had turned out as follows—

> 34 out of the 39 cases, or 87·5 per cent, proved very near the mark.
>
> 2 out of the 39 cases, or 5 per cent, were definitely wrong.
>
> 3 out of the 39 cases, or 7·5 per cent, were difficult to classify.

In this study, we may say with fair confidence that the interviewer was right nearly nine times out of ten after a short interview, carried out in the normal working of a busy Personnel Department, without the assistance of test results. This may give some indication of the level of validity which may be attained in practice.

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[1] "How Often Can an Interviewer be Right?" *The Supervisor*, October, 1961.

SUMMARY

1. How do the five headings of the Pentagonal Peg method relate to the Seven Point Plan?

First Impression and Physical Make-up covers many of the points considered under the *Physique* heading but places more emphasis on appearance, speech and manner as these can be important in an increasing number of jobs. *Qualifications* can be equated with *Attainments*. *Brains and Abilities* cover the same ground as *General Intelligence* and *Special Aptitudes*. *Motivation* can be linked with *Interests* but emphasizes the dynamics of the personality to a greater degree. *Adjustment* is concerned with much the same qualities as *Disposition* but draws attention more to the social-role characteristic of the individual.

2. Are there any other differences?

The Pentagonal Peg method introduces scales under each heading and puts forward a method of grading or measurement based on the average in the community for each set of characteristics.

3. What is the average for First Impression?

A man seen in the shopping centre of an industrial town on Saturday afternoon, dressed in a suit bought from a popular-price tailor, speaking with a certain amount of local accent, reasonably friendly and self-possessed when among his own associates, but lacking the self-assurance and knowledge of the world to move easily in strange situations.

4. What is the average under the Qualifications heading?

A secondary modern school-leaver who has been at about the middle of the top class in the "A" stream, has served an apprenticeship or has had a similar period of reasonably systematic training, has had some further technical education but gained no certificates of public standing, and is now in a skilled or high-grade semi-skilled job.

5. How are Brains and Abilities measured?

By standardized mental tasks calibrated on a representative sample of the population, or tests.

6. What is average Motivation?

The individual whose biographical case-history shows no evidence that he has made enough use of the opportunities presented to him by his way of life to move upwards into a higher bracket, but who, on the other hand, can never be said to have slipped back.

7. What is average Adjustment?

If there is no evidence in the case-history to push the pendulum upwards, in the shape of rising to a position of added responsibility or leadership, or to push it downwards by failing to fit in with other people or being rejected by other people, then the individual is showing average Adjustment.

CHAPTER XIV

TRAINING

INDUSTRIAL training in the past has been almost entirely informal. The new entrant to a semi-skilled job was put with an experienced worker, who might or might not be able or willing to pass his knowledge on. After a period of observation and perhaps some practice under supervision, the learner was allowed to go on on his own and if he was lucky enough to meet no unforeseen difficulties in the early stages he might in due course work up to a satisfactory rate of output. Much the same happened with entrants to a skilled trade, except that the training took longer and the apprentices, being younger, spent a longer time standing round watching and were often employed on menial jobs whose actual training value was quite negligible.

Under such conditions any attention paid to systematic training was bound to yield dramatic results, and many firms who have provided formal instruction and graduated practice in the job have been surprised and delighted at the rapid progress which could be achieved towards the standard rate of output.

This state of affairs made it easy for anyone prepared to spend a little time and thought on training to claim, with perfect justice, that great improvements could be expected from his "system." Any training scheme will produce results if it is introduced where none existed before, and in vast areas of industry whatever was done to train workers or staff was bound to be an improvement on the haphazard and unsystematic methods which were practically universal. We should not take for granted, therefore, that every training scheme which we find in industry today is completely sound and effective, even though it has produced results. Training methods should be based on an understanding of the learning process, as set out in Chapter V, and if we can make proper use of this knowledge we should be able to make very significant reductions in the time required to learn a job, while at the same time we should be able to achieve much higher standards of performance.

MOTIVATION IN TRAINING

We have already seen how large a part motivation plays in the learning process; in fact we can be quite sure that no one ever learns anything unless he sees good reason for doing so. In considering industrial training, therefore, it is advisable to turn first to the reasons for learning a job and to look at them from the new entrant's point of view.

At first glance this might seem far too simple to waste any time on, because it is surely obvious enough that people come into industry to earn their living and that unless they turn themselves into efficient workers they won't be paid and will have to look for another means of making an income. But this view of the situation presupposes first that the worker looks on his job simply as a means of earning money; secondly that he knows the standards of performance to which an efficient worker must keep; and thirdly, that he is unwilling to try an alternative means of making a living. And these three propositions are in actual fact misleading over-simplifications of the situation.

In the first place, all workers do not spend all day thinking about the money they are earning. There are too many things going on for any normal person to spend his day counting up the hours as they pass, saying to himself "That is four and ninepence I have earned, now it is nine and sixpence and by lunch time it will be eighteen shillings." He may do so for part of the time, in fact he probably often does, but his attention will also stray to the work he is doing, the people round about, and the probable attitudes of the supervisor in charge. The money a worker earns is a very important element in his motivation, but it is not the only element.

In the second place, the standards of performance required to hold down a job are seldom definite and widely known. It may be generally accepted that a trained man ought to achieve an output of, say, fifty units a day, but there are generally a few in the shop who are only producing about forty-five and perhaps one who is producing as few as forty. Moreover, if someone fails to reach even that standard he will not necessarily lose his job; indeed he is more likely to be tried on some other work. Failure to reach a known standard, therefore, is seldom widely accepted as leading inevitably to dismissal.

In the third place, there are many other available ways of earning a living, particularly during a period of full employment, and if a man feels dissatisfied with his progress in learning one type of work he may turn to another without wasting time bewailing his lack of success. This picture of workers being motivated solely by a desire to earn their living through learning to reach a certain standard at a particular job is, therefore, much too simple to be realistic in the present-day conditions of industry. We must look a little more closely if we are to understand motivation sufficiently clearly to manipulate it intelligently during the learning process.

The Reinforcement of Motivation

We may get a clearer idea of the matter if we think of a young man beginning his apprenticeship at the age of, say, fifteen. On his first day he is probably very keen indeed, his new overalls and the unfamiliar routine of a workshop having enhanced the excitement he already feels at being away from school and among men at work. He probably carries in his mind a vague picture of himself as a skilled tradesman, sharing the prestige and security of employment which goes with that status and earning a rate of pay which is well above that of an ordinary labourer. During the first week or so he will be quite strongly motivated, but the goals at which he is aiming will be complex, including, as we have noted above, prestige, security of employment, and a certain level of income. They will also be rather indefinite, for he will be unable to describe exactly what he means by prestige and security; and they will be remote, for he will not be able to achieve any of them for five years or longer.

How long do we imagine that a boy of fifteen will continue to work conscientiously towards such a remote, indefinite and complex goal? Certainly not for the whole five years it will take him to reach it; in fact if we have any experience of young people we shall be quite prepared to find him larking about the shop and dodging the foreman in a few weeks' time—just as soon, in fact, as he is sufficiently familiar with his surroundings to recover his self-confidence. To keep a young man working throughout a five-year training course we must do something to bolster up his motivation before his initial enthusiasm evaporates completely.

How can this be done? Much will depend on the circumstances of each job, but in this case it is obviously necessary to do something about the complexity, indefiniteness, and remoteness of the goals. If his vague conception of a tradesman can be replaced by a reasonably precise idea of the knowledge and skill he is expected to acquire then he will understand that he must learn to file and chip to certain tolerances before he can be considered proficient as a fitter. Likewise he must know something about drawings, which in turn will involve some familiarity with mathematics. In this way the apprentice can substitute a series of precise goals for his general aim of becoming a tradesman.

These precise goals will go far towards reinforcing his motivation, for they are more personal and more proximate. Instead of merely serving his time in the rather remote hope of being accepted as skilled in five years, he will be working to reach a certain standard in, say, the erecting shop during the six months he is spending there, while at the same time he is aiming to pass the end-of-term examination in mathematics in four weeks' time.

More will be said on the subject of motivation in Chapter XV, but from the training point of view it is always advisable to reinforce it by substituting short-term goals for remote ones and precise standards for vague levels of performance. In most cases this can be done by introducing intermediate levels of performance at which the trainee should aim during the learning process. The setting of these standards will be discussed later.

THE DEVELOPMENT OF SKILL

In Chapter V we called attention to two different kinds of learning process. One of these was the slow and steady development of skill in a simple movement and the other was the quick intuitional comprehension of a situation. The former is characterized by a slow but consistent improvement in performance, while the latter leads by a rapid jump to near the maximum performance in the first few trials. As was pointed out at the time, most learning situations include both these elements so that in most cases a learning curve shows periods of rapid improvement interspersed with periods where performance improves very slowly or actually stays still.

These two elements point in turn to the two factors on which successful training will depend. One of these is practice and the other insight, and their effects alternate and overlap. The development of skill depends in part on the operator going through the same set of motions over and over again, while at the same time rapid improvements will be seen at times as habit-patterns integrate and as the process is more clearly understood. A successful training scheme must provide adequate practice and at the same time encourage insight, but there are at times difficulties in connexion with each.

Providing a learner with the opportunity to practise means in real life that he will spoil a certain amount of material, for he will inevitably make mistakes and produce sub-standard work in the early stages. In the training of sewing machinists this may not matter, for very little expense will be involved in the provision of waste fabric which can be stitched over and over; but if the material in use is a valuable metal the prospect of a learner scrapping several pounds' worth before he turns out a single usable article may be more than management can face. Some means, however, must be found to get round this difficulty because, without practice, skill cannot be acquired and it may be quicker in the long run to provide a similar but less expensive material for a learner to make his mistakes on. It is no use trying to avoid mistakes by making the trainee watch a skilled worker instead of having a go himself.

Insight

Turning to the question of insight, we are aware of the limitations of our knowledge. Once we have studied a number of people learning the same job under similar conditions we should be able to build up a series of learning curves and observe their regularities. This might show us that between, say, the tenth and fifteenth trial there was usually a rapid improvement in performance which seemed to be due to the trainee's getting the hang of the job as a whole. Again we might find that between the fortieth and fiftieth trial there was usually a notable increase in speed though accuracy was still somewhat low, while between the hundredth and hundred-and-twentieth trial accuracy showed a rapid improvement. With this information at our disposal we might postulate three stages of learning—

1. An insight into the relationship of the various parts of the job between the tenth and fifteenth trial.
2. An integration of muscular habits leading to an increase of speed between the fortieth and fiftieth trial.
3. A further integration leading to an improvement of control between the one-hundredth and one-hundred-and-twentieth trial.

The next step might be to try to encourage these integrations by such measures as—

1. Explanation of the job as a whole during the trainee's first few trials.
2. Drawing the trainee's attention to speed from the twentieth trial onwards without paying much attention to accuracy, in the hope of achieving the improvement in speed by, say, the thirtieth to thirty-fifth trial.
3. Drawing the trainee's attention to accuracy from the fiftieth trial onwards, in the hope of encouraging the improvement in this aspect of the job by, say, the seventieth trial.

When we have made a close study of a particular training programme it may be possible thus to anticipate and accelerate every development, but few operations have so far been subjected to this close scrutiny. We must fall back, therefore, on a few general ideas, such as that improvement is usually very rapid during the first few performances due to the learner getting the feel of the job as a whole, so that any explanations which may facilitate this process should be provided at this point. In the later parts of the training explanations in greater detail may help to develop insight.

Practice Periods

It will begin to be apparent that we cannot expect good results by leaving a trainee to practise away on his own for long periods. This runs the risk of boredom and discouragement with a consequent falling off in motivation. Better results will usually be attained by splitting up the practice periods so that the trainee is never left alone for long periods at a time. This has several advantages.

In the first place it facilitates the actual learning process. Experiments in learning, which are designed to show in detail how performance improves, have made it possible to find out how much has been learned after a period of two hours of continuous practice. Comparisons can then be made with the amount learned after three forty-minute periods, six twenty-minute periods or twelve ten-minute periods. The results were as follows—

No. of Periods	Length of Period (minutes)	Total Time (minutes)	No. of Letters
1	120	120	135
3	40	120	195
6	20	120	255
12	10	120	265

The task on which these figures were worked out was the fairly simple substitution of letters for digits. Though this may not seem to have great direct relevance to industrial training, nevertheless it establishes the general principle that when the same amount of time is broken up into twelve practice periods, the performance achieved is almost twice as good as when it is spent in one period (see Fig. 24).

Distributed practice periods obviously reduce fatigue and they can be used to reinforce motivation. However, there seem to be three main reasons why they facilitate the learning process. In the first place we seem to forget wrong associations more quickly than correct ones and consequently when a gap is allowed between two practice periods it will enable us to forget our ineffective methods, while the effective ones remain. In the second place, older associations are strengthened more by practice than more recent ones; thus anything we learned yesterday will be more improved with practice than what we learned within the last half-hour. Distributed practice periods, therefore, facilitate learning by allowing habits to "age."

The second advantage in splitting up practice periods lies in the opportunity it provides for checking progress, by requiring the trainee to demonstrate his progress at the end of a period. Unsupervised practice over a long period is of little use in learning, as when a group of children were left to read over lists of syllables in an attempt to memorize them. The average score at the end of the period was seventeen syllables. Another group of children spent the same amount of time learning the syllables, but in this case 80 per cent of the period was devoted to repeating or reciting the syllables to a teacher. The average score of this latter group was thirty-five, or more than twice that of the first group. Each period of practice is directed to a definite end and, as one would expect from its value in reinforcing motivation, is very much more effective in enabling the individual to learn the material.

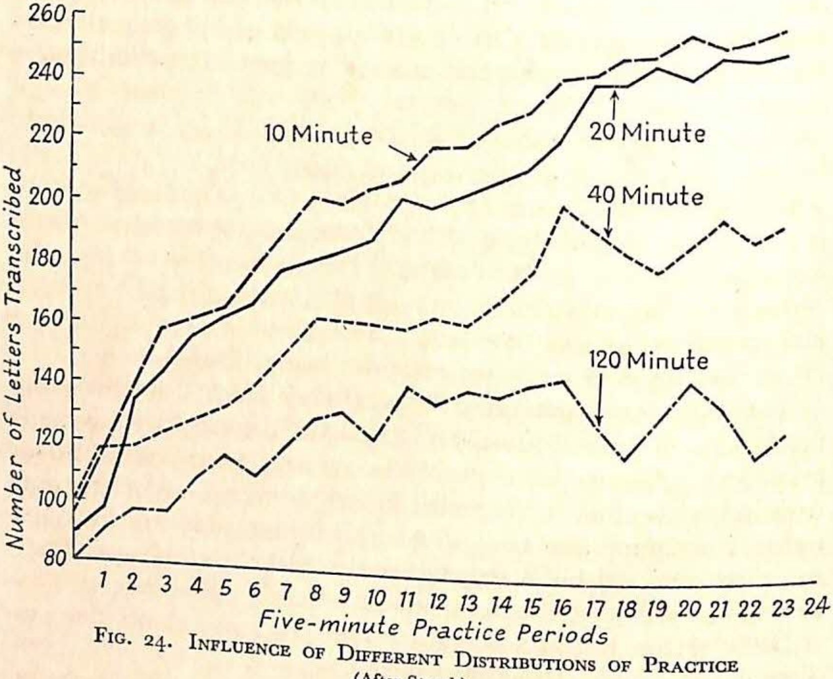

FIG. 24. INFLUENCE OF DIFFERENT DISTRIBUTIONS OF PRACTICE
(After Starch)

STANDARDS

The third advantage of splitting up the practice periods concerns the setting of standards. Most of us accept certain standards quite unconsciously—standards of behaviour or standards of achievement. If our performance measures up to these standards we shall be quite satisfied with ourselves, but if we fall below these standards we shall be aware of it and shall seek an opportunity to do better and to rehabilitate ourselves in our own opinion.

These standards have an effect on the learning process, for we shall always be trying to measure up to them. The small boy at school tries to run as fast as the others and is satisfied with his performance if he is not left behind. A little later on he begins to match his performance against a more objective standard, the school record, say, and will be dissatisfied if he falls much below that. Later on still, if he continues to be interested in running, he may take as his standard the world record and aim at improving his performance until it can stand comparison with that. As anyone whose performance at running is better than the world record thereby reduces that record and so sets a higher standard for everyone else to aim at, we can be sure, in this field at least, of maximum effort and an ever-increasing standard of attainment.

But in many types of industrial work there are no world records, nor indeed are there any local records, so that the standards of performance which are accepted as adequate may often be much lower than they need to be. The new entrant, when introduced to a quite unfamiliar job and left to work away on his own, may find that it takes him an hour to make one not-very-satisfactory article. He may unconsciously accept this as a standard and spend the rest of the day at about the same level of performance.

At the same time, of course, a beginner's first attempt must not be compared straight away with the performance of an expert. Who would ever learn to play the piano if his early fumblings were recorded and played back after a performance of Solomon's? Comparison with such a standard would emphasize the poorness of the learner's performance and would lead to grave discouragement by making the expert's standard seem quite unattainable. When faced with what seems an impossible standard most people give up trying. It is the standard which is a little above our present performance but which seems perfectly possible which calls out maximum effort.

Perhaps one of the most important elements in industrial training is this manipulation of standards. Set suitably low in the early stages they can be used to encourage trainees and provide the intermediate goals so important to motivation. Raised in accordance with the improvements which a study of the learning curve leads us to expect, they may help trainees to break through the flat periods sooner than they would otherwise do. Set finally at levels which indicate something near the best possible performance, they will ensure that there is no levelling off in the later stages of training at a standard which is below what it should be.

THE APPLICATION OF THESE PRINCIPLES TO INDUSTRIAL TRAINING

W. Douglas Seymour, in his book *Industrial Training for Manual Operations*,[1] gives some striking examples of how these principles can be applied in the routine working of an industrial company. His first stage is to analyse a task into its sensori-motor elements, or to discover the "cues" which the experienced operator recognizes through the various senses involved in the task—sight, hearing, touch, etc. These cues trigger off muscular movements, which in the case of the experienced operator have become habit-patterns which spring effectively and economically into action as they are required for the smooth performance of the task. The main difference between the experienced worker and the trainee is that the latter does not appreciate the significance of these cues, while his muscular responses are neither smooth nor automatic.

To speed up the trainee's recognition of the cues and to develop his control of the muscular movements, a series of exercises can be devised, each of which is, in effect, a sensori-motor element in the complete task. These exercises are practised one at a time, the trainee aiming at a level of speed and accuracy in that element which represents that of an efficient operator on the complete task ("piece-work speed"). When each of two such exercises can be performed to this standard they are put together and practised until piece-work speed is attained on this larger portion of the task. In this way the complete job is built up, the trainee always aiming at a standard of performance which is within his reach and progressively mastering the job by a series of short practice periods.

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[1] Pitman, 1954.

These methods have proved to have two main advantages in practice. On the one hand they reduce training time, with its consequent under-utilization of equipment and risk of spoiled work. This alone would justify the not inconsiderable time and expense which the installation of such a system involves, for, if new starters can reach a standard of output equal to that of experienced operators in three weeks instead of three months, the savings will be considerable. But at the same time wastage among trainees, which is another source of loss, is also considerably reduced. Under the conventional methods of learning on the job by observation of a skilled operator (often characterized as "sitting next to Nellie") the risk of boredom and discouragement is very high indeed. There is so much standing around and watching, while the gap between the trainee's performance and that of the experienced worker is so depressingly wide and doesn't seem to be getting any less. This feeling of lack of progress leads many trainees to decide that they are not getting anywhere and they consequently leave to look for another job. If, on the other hand, they are always aiming at a standard which can be reached after only a few hours' practice, even if this represents no more than part of the complete job, then there is enough feeling of achievement to encourage the trainee to persevere.

SUMMARY

1. How far has motivation to be considered in industrial training?

Motivation is all-important in training, to the extent that the strength of the motivation determines the efficiency of learning. In most industrial training situations the desire to become a skilled worker or to keep one's job is too remote and imprecise to be adequate. In many training situations it may be advisable to substitute short-term precise goals in order to stimulate the trainee's motivation.

2. What are the two main learning processes we have to consider in training?

The first is practice which enables the muscular habits on which manual skills depend to be built up gradually, and the second is insight which leads to quick improvements in performance as the various parts of the task are seen in relation to one another. Providing a trainee with adequate opportunity to practise may raise practical problems of spoilt work which must somehow be faced.

3. What can be done to facilitate insight in a training scheme?

Once we know enough about a particular learning process we shall see from the learning curve where the various insights develop. It then becomes possible to encourage these insights by providing the explanations and guided practice which may cause them to develop sooner. In most cases the first insight into the job as a whole can be encouraged by taking the trainee through the complete process in the early stages.

4. How should practice periods be arranged in training?

There is a considerable amount of evidence to show that a number of short periods of practice are more effective than one long period. This is probably due to the fact that short periods reduce fatigue and can be used to stimulate motivation, that they cause ineffective methods to be forgotten while effective ones remain, and that older associations are more strengthened by practice than are more recent ones.

5. Should progress be checked at the end of each practice period?

Nothing is more wasteful and ineffective in training than allowing trainees to potter along for long periods without supervision. Progress should be checked at each practice period by making the trainee show what he can do and how far he has got. This reinforces motivation, enables some control to be kept on standards, and gives direction to all the trainee's efforts.

6. How far are standards important in training?

Most of us work, consciously or unconsciously, to a standard, and are quite satisfied if we can keep up to it. If that standard has been set haphazardly and is below what it should be we shall be working inefficiently. Many standards during and after training have grown up by tradition and are in many cases well below what could reasonably be expected of a normal person. Unless care is taken to impose reasonable standards of progress and attainment throughout the training period, the pace will tend to be set much slower than it should be.

CHAPTER XV

INCENTIVES

THE word "incentive" is widely used nowadays and, when considering people at work, it generally means something which makes them work harder. There is some danger of confusion because "incentive" can be thought of in three different ways and the same word is frequently taken to mean any one of them at different times. The three uses between which we must distinguish are—

(*a*) Something external to the individual which he will strive to obtain, e.g. "Money is an incentive."

(*b*) Some manipulation of the work-situation which will encourage the individual to work harder, e.g. a "bonus incentive" system.

(*c*) Something within the individual which encourages him to do something.

To clear our minds on this subject it may be as well to revert for a moment to Chapter VI, where we discussed the subject of motivation. It will be remembered that human beings are subject in the last resort to a few simple basic urges, the satisfaction of which is necessary to keep them alive. Hunger and thirst, the need for clothing and shelter, the desire for companionship—these are universal in their application throughout the world. How we satisfy these urges, however, varies according to climate, geographical conditions, and state of development. One community may hunt and fish for its food, another may till the ground, while a third may make things and trade them with other people. The methods by which a community carries on its economic activities will vary from one place to another, being sometimes primitive and simple, and sometimes complex and highly developed.

If we consider any individual, therefore, we can trace his motivation through various stages, the first of which will be simple and universal, while the later ones will be more complex and peculiar to each person. The stages will be roughly as follows.

1. *Basic Urges Necessary to Sustain Life.* Hunger, thirst, the need for clothing and shelter, are universal among humans.

2. *Means of Satisfaction Available to the Community.* Determined broadly by geography, climate, and the level of development.

3. *Private Goals Set by the Individual for Himself.* Dependent on his abilities, upbringing, and interests, and infinitely varied according to each individual's preferences. (See Chapter VI on Motivational Patterns.)

Stage 1 is comparatively easy to understand, for it includes all that is necessary to keep a human being alive. Stage 2 depends on the community in which he lives, some account of which is necessary before we can approach Stage 3, which can only be comprehended in terms of the individual case.

THE INDUSTRIAL CULTURE-PATTERN

When we consider the motivation of workers in industry, we must think of the means of satisfying their basic urges which the conditions in which they live make available to them. Standing aside from our daily lives for a moment, let us look at the community in which we live as though we were strangers from outside, and compare it with others in different parts of the world and at different times. How would we sum it up? As pastoral, where people feed and clothe themselves by tending flocks and herds? As agricultural, where they till the soil? Or as a community in which people hunt and fish?

All these elements are perhaps present, but they are hardly the main theme. Ours is a community in which most wants are satisfied by things bought in shops, these things having been manufactured or processed by the work of others from materials grown or extracted either here or abroad. The ordinary person has not to struggle with nature to feed or clothe himself, for all he may need is ready waiting for him and he may buy it with money which is equally exchangeable for shoes or sugar, trousers or tea. Moreover if he does not want to buy anything today, his money will be just as good tomorrow should he want anything then.

In an industrial community such as ours, therefore, money is the universally useful commodity. Everything can be valued by means of it, and its possession enables us to satisfy any reasonable want. The individual, in the vast majority of cases, tries to supply himself with money, and the most usual means of doing so is to find an opportunity of taking part in the process of manufacturing, transporting, and distributing goods, for a weekly or monthly payment.

Stage 2 in our consideration of motivation, therefore—that which concerns the means which the community makes available to the individual for satisfying his needs—is fairly distinct in a modern industrial state. There are, of course, exceptions, for a few people work on their own, like artists or writers, and a few people do not work at all. Housewives work within the family in conditions which are usually worse than would be tolerated in any industrial company, and there is always a certain proportion of agricultural workers. In the main, however, most of us have jobs of one kind or another, and though the complex pattern of activities which make up the economic life of the community produces many different kinds of job, nevertheless common elements can be discerned in practically all of them. One of these is that the individual works for a money payment. As we saw above, money is universally useful and with it we can satisfy any reasonable material want.

THE WORKING OF THE MONEY INCENTIVE

If people work to earn money in the first place, then does it follow that they will work harder to earn more money? This is one of those questions which are so misleadingly simple in appearance that it seems as though only a born fool could give any other answer than "Yes" to them. The trouble is that while it is broadly true that people will work harder to earn more, it is not true all the time and in every case. There are exceptions to the working of this rule and we must understand them if we are to understand incentives. For the moment, however, let us put these exceptions to one side and consider how the money incentive works.

Having joined up with a body of people who are making, transporting or distributing something useful, the individual undertakes to work in return for a wage or salary. There are various kinds of work he may undertake, however, some of which are quite simple and can be picked up in half a day and some of which are very difficult and require months or years of training. Inevitably a kind of "supply and demand" situation will be set up, and as only a limited number of people will be able to undertake the more difficult jobs they will come to command more money.

In this way a scale of payment will develop. The very difficult jobs which only a few people can do successfully will be paid the highest wages, while the simplest jobs which anyone can pick up will be paid lowest. The individual, seeing that one way to earn more money is to undertake more difficult or responsible work, will wish to get one of these better jobs because of the remuneration it offers. There will always, therefore, be competition for better paid work, even though it demands more from the individual who undertakes it, and consequently there will be a fairly universal desire for promotion to a better job.

On one particular job, however, this universal desire for money has made it possible to link up more effort with greater remuneration. Suppose a worker is taken on to peel potatoes, at a wage, say, of five pounds a week. So long as his wage is forthcoming he can dawdle over the job and invent excuses for not having peeled more than a stone or so in a day. The responsibility for ensuring that he gets on with the job and turns out a reasonable number rests in this situation with the supervisor, as indeed it usually does when people are on a time rate.

Suppose, however, that the situation is arranged differently and the worker is paid half a crown for every stone of potatoes that he peels. If he dawdles and only gets through a stone a day his wage will shrink to 12s. 6d. for a five-day week, whereas if he works hard and steadily and gets through 10 stones a day his wage will increase to £6 5s. Only the very simplest mind would fail thus to connect cause and effect and to make an effort to peel as many potatoes as possible during the working day.

This, of course, is a piece-work system and it has the advantage of transferring the responsibility for calling out effort from the supervisor to the worker himself by linking it up with his desire to earn more money. Straight piece-work systems are not usually practicable nowadays because in most trades minimum wages have been agreed on a national basis. Modifications of piece-work are widely used, however, the aim of which is to combine a minimum wage with extra payment for increased effort. Most of these depend on determining (usually by time-study methods) how much the worker can produce in a normal working day by the ordinary amount of effort. This is accepted as the standard rate of output and anything above it is paid for at an extra rate; the worker is thus told, in effect, that if he wants more money he must make an extra effort and produce more than a certain standard.

Limitations to the Financial Incentive

The working out of these bonus-incentive systems in practice is not always easy. The establishing of a standard, for example, depends in many cases on timing a worker on a specimen task at normal speed and using this as a basis. But what a "normal" speed consists of and what allowance should be made for rests and interruptions are questions which it is not always easy to decide on an objective basis. And when one side has an interest in getting the standard time set as high as possible, while the other has an equally strong interest in keeping it as low as can be managed, there is room for considerable argument which is not always amicable. In the same way it is difficult to ensure that the standards set for each job are strictly comparable and in practice some tend to be easier while others are significantly stricter. In normal working this means that on one type of work more money can be earned than on another which involves just the same amount of effort.

The need to "adjust" rates so as to reduce these inequalities means that changes have at times to be made. If any of these changes involves a reduction in what the worker earns there is a danger that he will react in a hostile manner and the suspicion will grow that the system is designed merely to call out maximum effort on his part without the slightest intention of allowing him to earn more than a certain standard of wages. From this it is an easy step to reducing effort to a level where something more than the time rate is earned but not enough to attract attention and cause the rate to be cut. The original intention of the system thus becomes vitiated and a kind of bargaining game takes place between those who set the rates and those who work them.

One reason why this happens is that such systems are based on the theory that the individual's desire for money is steady and continuous, and that he will always be willing to put forth an equal amount of extra effort to get an equivalent return in more money.

The Point at which the Money Incentive Loses its Effectiveness

But as any economist knows, this "infinitely elastic demand" is quite a rare occurrence, and it is rather more usual for a slackening-off process to take place after a certain point. In the case of water, for example, a man dying of thirst might be willing to give all that he possessed for a drink. Once his thirst was slaked he would be less willing to pay a high price, while we, to whom water is available out of the tap, would not be prepared to pay any price at all.

The position with money is rather similar. A man who has no money and who sees no prospect of getting any will seize any chance of work which offers him a wage and he will work very hard to hold on to that job. But the man who already has a job in which he feels to some extent secure will not necessarily put forth the same degree of effort to earn more. There is a point at which the incentive value of money drops off and in some cases this point may be reached as soon as the individual's most pressing needs are met. It is only by studying the individual on the lines laid down in Chapter X that we can get some idea of where this point will be reached.

Returning for a moment to consider the culture-pattern in which we live, there are a number of things which affect the individual's reaction to a money incentive, quite apart from this inevitable dropping off after a certain point. At the bottom end of the scale our social security services prevent anyone from falling below a certain minimum, so that people are protected from the desperate need to take any kind of work in order to escape starvation. Higher up the scale taxation begins to make itself felt so that when an individual begins to earn more than, say, ten pounds a week, the Chancellor of the Exchequer will take quite a substantial amount from him. Once he begins to earn very large amounts the situation can arise where the Chancellor appropriates 17s. 9d. out of every pound and the individual is left with only 2s. 3d.

But besides these variations in the individual's desire for money, there is a further complication. Human attention seldom remains steady for long at a time and very few people continue to think about money all day and every day so long as their basic wants are reasonably satisfied. It is quite true that if we are hungry we shall always be thinking about food, but after a meal our attention will wander off to other matters. We have to be very near the bread-line, therefore, before we spend all the working day saying to ourselves "That's five shillings I've earned up to now. By twelve o'clock it will be fifteen, and this afternoon it will be up to a pound at three o'clock." This may happen at times, but it does not go on all day and every day.

We have come to the point, therefore, where we understand that in an industrial community the normal way of satisfying our wants is by buying things with money, and that the primary incentive to work is to earn enough money to live on. So long as the individual's basic wants are unsatisfied the primary incentive to work is money and he will work harder to earn more money. After a certain point, however, the money incentive will become less effective. This point will vary with different people in different jobs, but as soon as an individual says "What is the good of bashing away at the job just for an extra pound a week?" or "Why should I undertake all this extra worry and responsibility for another hundred a year?" it has been reached.

OTHER INCENTIVES IN THE WORK-SITUATION

The question then arises of what takes the place of the money incentive once this point has been reached? Will an individual then prefer leisure to money so that it becomes impossible to get him to take any interest in his work at all beyond that point? If this is so then we shall have the kind of situation which was alleged to occur in certain coalfields where miners worked four shifts a week because they couldn't make enough to live on in three, and it was only round Christmas and holiday times when they needed more money that output could be raised by working a full shift. The only remedy for this state of affairs would be to try to multiply the individual's wants so that he would always be in need of more money to buy the things he needs.

In some ways we shall find this process going on in industrial communities, for consumer goods advertising, the multiplication of goods, services and entertainment which can be bought, and all that is associated with our "rising standard of living" is suggesting new wants to the individual. Among ordinary working people, however, the effects are rather uneven, because the wants of most men for clothes, food and drink, and entertainment tend to be limited. It may be that this kind of reinforcement of the money incentive works best indirectly through the family, because it is when one turns to the provision of goods and services for a family that one becomes aware of a very large unsatisfied demand.

But this reliance on a reinforcement of the money incentive alone is not entirely satisfactory because it will be difficult to run most businesses if the individual workers merely come in to work until they have earned as much as they want and are then quite prepared to knock off and go home. What other satisfactions can be drawn from work which would encourage an individual to put out more effort?

Satisfactions in the Immediate Task

There are certain satisfactions which can be drawn from the actual work itself, or the immediate environment in which it is carried out. These have a certain importance as incentives, not always to the extent that they necessarily cause people to work harder at any one job, but they will certainly be effective in calling out more effort from an individual in one situation as contrasted with another.

There is, for example, a certain satisfaction to be gained from the exercise of skill. The pilot of an aircraft may well wish to fly even though he is not being paid for it, simply because of the pleasure he derives from controlling his machine and using the skill he has developed through many hours of practice. The same sort of thing may be found in those who sail boats, drive vehicles, or use tools, and in certain cases the opportunity to do the work will have a certain importance as an incentive because the individual will be glad of the opportunity to use his skill. Closely allied to this is the satisfaction to be derived from making things. Many people get considerable pleasure from being able to say "I made that," and while we are probably prepared to believe that this is part of the incentive to which an artist or craftsman responds in his work, we may be slower to appreciate that a semi-skilled worker operating an automatic machine may get the same kind of satisfaction from his job, though perhaps on a different level.

Possibly this is due to the fact that we attach different levels of prestige to the two kinds of work. We can imagine that someone might be proud of being a surgeon or an artist, and there is no doubt that the public recognition which attaches to jobs like that acts as an incentive to young people, causing them to work hard in the hope that in due course they may qualify for admission to that select and distinguished company. Few young officers have failed to repress a thrill of pleasure the first time they were saluted by an "other rank," and a newly qualified physician feels much the same way the first time he is addressed as "Doctor."

It is unrealistic, however, to confine this satisfaction in the prestige of a job solely to work which is recognized on that scale. The same considerations apply to the skilled ranks in industry and a fitter, carpenter, or electrician stands in much the same relation to other workers. A considerable level of prestige attaches to any "tradesman's" job, partly connected with the long apprenticeship involved, and partly due to the fact that his skill and experience enable him to cope with situations in which another person would be incompetent. Gaining and keeping this distinction of being skilful and knowledgeable where ordinary mortals cannot compete is an incentive to which many people respond in their working life.

One must always be prepared for irrational standards of prestige, however, for in industry it frequently happens that certain jobs, which seem to outward appearances little different from the remainder, come to be accepted as "better jobs." There will be competition for these, and even though management may not understand why they should be thought preferable, it should be aware of the fact that this is so. It is possible at the same time to enhance the prestige of certain jobs quite deliberately, by such means as giving them titles, providing a special uniform or taking steps to ensure that the importance of the work is more widely recognized. The jobs of cleaners in food factories have been made more attractive in this way by emphasizing the quite obvious fact that the purity of the product depends in great measure on how they do their work.

The Effect of the Surroundings at Work

Another group of satisfactions can be drawn, not perhaps from the work itself, but from the surroundings in which it is carried on. The dirty and unpleasant cellars in which some factory work was done had a "disincentive" effect, and indeed only those whose need to earn a living is very pressing could now be induced to work there. The movement towards better physical conditions at work has meant that in certain factories, with their colour-washed walls, pleasant lighting, good ventilation, comfortable seating, rest-pauses, "music while you work," and so on, it is at least no hardship to work, even though it is not a positive pleasure.

Closely allied to the physical surroundings at work is the social atmosphere, and here the incentive value can be very strong indeed. We all know the pleasure of being among agreeable people where encouraging and reassuring relationships abound and where a spirit of mutual appreciation and comradeship prevails. Such an atmosphere ought to be characteristic of the family group and it is frequently found in spare-time groups where people have come together spontaneously for some leisure activity. There is no reason, however, why such an atmosphere should not prevail at work, and if such a team-spirit can be built up individuals will make an effort to remain in such a working group in preference to another. It may be, indeed, that the opportunity of joining such a group will act as a strong incentive, particularly in a culture-pattern like our own where the opportunity of participating in groups where this quality of relationships prevails is severely limited.

There is, however, always the possibility that the immediate working group may have set itself standards of output and behaviour which are not those that management expects. There are examples of working groups where limitation of output is practised and where other forms of non-cooperation with management are the rule. In order to remain a member of such a group, the individual must conform to these standards. Thus, we may have a situation in which the worker may be pulled in different ways at the same time. The bonus or piece-work system may offer him more money for sustained and efficient effort on the job. His own disinclination to sustain this effort may grow as the day wears on and he becomes tired and bored with his task. Managers and supervisors may remind him that a certain level of output is an implied condition of his employment. His workmates may make it plain that anything above the standard of effort and output which is accepted as the norm of that group will be met with gestures of disapproval and even ostracism or ridicule. How these incentives work in relation to each other on the motivation of any individual at any one time is impossible to predict, so that any attempt to provide a simple answer to the problem of incentives at work is foredoomed to failure.

In trying to understand incentives, therefore, we must take a number of factors into consideration. The satisfaction to be drawn from the work itself or the surroundings in which it is carried out may act as an incentive through such things as—

(*a*) pleasure in the exercise of skill;
(*b*) the prestige of the job or the position it carries;
(*c*) appreciation of a comfortable physical environment; and
(*d*) pleasure in the agreeable atmosphere of the working group.

In certain circumstances all these may act as incentives once the basic incentive of money has begun to lose its effect. In certain other circumstances they may act the other way round.

Awareness of the Purpose of Work

Turning again to the work of such people as the physician, welfare-worker, or missionary, we may find a situation where the money incentive is not important, and where the individual is not getting any very active pleasure out of the actual work itself, or its surroundings. What makes such individuals work so devotedly as many of them do, if the incentives we have been considering are not effective? Probably in these cases there is a sense of responsibility to other people, an awareness of the social obligations of their work, that has either taken the place of normal incentives or has come in to supplement them. Think, for example, of the Dunkirk evacuation when some wounded had to be left behind and the doctors drew lots to decide who should stay with them. What incentive could be effective in that situation except a realization that these casualties needed medical attention which only a doctor could provide, and an acceptance of the responsibility for providing that attention as outweighing any considerations of personal safety or comfort?

Most people would probably agree that in certain types of work this acceptance of social obligation acts as an incentive, but they might feel that it had little importance in most industrial jobs. It is unfortunately true that in very many cases the hourly-paid worker's horizon is limited to the doing of a few routine operations in return for a weekly wage. This is probably one inevitable result of the subdivision of processes which makes each individual's job so small a part of the whole that his contribution to the final product is unrecognizable and meaningless. In a village economy it is easier for the baker, the blacksmith or the cobbler to see the results of his work being used by his neighbours and thus to be conscious of its social purpose. If the baker, for example, so far forgets himself as to drop a cigarette end in the dough, his neighbours will quickly recall him to a sense of his responsibilities to the community. But for an operative in a flour-mill to realize that the stuff passing through at high speed will be cooked and eaten by people like himself requires much more of an effort of the imagination. High-speed, efficient production inevitably increases the gap between the worker and the eventual consumer.

This is not to say that an industrial worker can never be inspired by the sense of social obligation of his job. In times of crisis the dependence of others upon him may be obvious, or the effort of imagination needed to realize them may be more easily made. The period in 1940 after Dunkirk illustrates this most graphically for then everyone understood that the danger of invasion was a very real one. Industrial or other work which had any connexion with our military preparations (and most of it had) was done with great devotion, long hours were worked, and production went up. The social obligation to help in the defence of the country was accepted almost universally and acted as a most effective incentive.

We cannot, however, live in a perpetual atmosphere of crisis, and indeed it would be most unfortunate if impending disaster of that magnitude could alone show the meaning and purpose of most industrial work. But steps can be taken, and in some industries are being taken, to show people in the company that the products on which they are working will be used by people like themselves for purposes they can understand and appreciate. Such measures are effective in fostering awareness of the social obligations of a job and these in turn constitute an incentive to which the best and most responsible individuals will most readily respond and which can supplement more selfish motives with something more altruistic.

CONCLUSIONS ON INCENTIVES

How then can we sum up the subject of incentives? Not in a few simple words nor by a sweeping generalization, for people are moved to seek very many satisfactions in their work. We might think of a curve of distribution such as we discussed in Chapter IX. At one end we should find those who look only for money in their work, either because their material needs press heavily upon them, or because they are insensitive to the other kinds of satisfaction which work can offer. At the other end we should find those devoted souls whose sense of vocation makes them so conscious of their duty to others that they live in poverty while working to relieve sickness and distress. In the middle we shall find those who, while working primarily to earn a living, respond also to the incentive of pleasant surroundings and meaningful, responsible work.

How far does this help those who have to think about the incentives in one particular work-situation? Not very much, perhaps, because it does no more than expose an already complicated picture and provides no simple answer to the problem of "increasing incentives." It does, however, suggest that to improve the incentive value of a job we must consider a number of factors, no one of which will be effective with all the people all the time, but some of which will be effective with some people part of the time and some with others at different times. The kinds of thing that can be done are these—

(*a*) to ensure that those working in the job earn an adequate living—adequate in relation to what they could gain in similar types of work, and in relation to their levels of material expectation (in standards of living);

(*b*) to ensure that the individual is remunerated for extra effort on a scale which makes him consider it worth his while to work as hard and as accurately as he can without undue fatigue and strain;

(*c*) to ensure that the individual finds satisfaction in the actual work he is doing and in the immediate physical surroundings in which he works;

(*d*) to ensure that the relationships in the immediate working group are so agreeable that the individual will consider it worth making some effort to remain with that group;

(*e*) to ensure that the individual finds that the prestige of the job is such that he will make some effort to keep it;

(*f*) to ensure that the individual finds enough meaning and purpose in his work to make some effort to live up to its social obligations.

A great part of the foregoing reverts to the question of fitting the individual into the right job. It also means that the individual must find some kind of incentive to meet his attention wherever it may stray throughout the course of the day or during the working week.

SUMMARY

1. How are incentives linked to motivation?

Motivation is something within the individual which makes him strive for certain things. Incentives are those things external to the individual for which he strives. Human motivation may be reduced to its essentials in the striving for food, shelter, companionship, and the like, but the culture-pattern will determine the means available for securing these, while the individual's own motivational pattern will affect the private and personal incentives to which he will respond.

2. In an industrial society, what are the means available to the individual for satisfying his basic needs?

In this country we can buy anything we need in shops provided we have the money to pay for it. Money, therefore, is the universally useful commodity, for it is the means of satisfying any material want. It has, in consequence, a universal value as an incentive. The normal way of procuring money to satisfy our needs is to find an opportunity to take part in the process of manufacture or distribution for a wage or salary.

3. Is the money incentive universally and uniformly effective?

In the sense that anyone who has no money will be willing to work to obtain some, yes. In the sense that anyone who has some money will be willing to work correspondingly harder and longer to earn the same amount in addition, no. Once a certain standard has been reached, which will vary with the individual, the disinclination to make the extra effort, or the competing claims of leisure, will tend to reduce the effectiveness of the money incentive.

4. What means have been used to link up the money incentive with extra effort, and how effective are they?

Higher pay for more difficult and responsible work along with a limitation to the number of people who can deal with it effectively creates competition for better jobs. In addition to this, piece-work or bonus-incentive systems link up extra effort with extra remuneration. The establishment of standards for each job, however, being based ultimately on subjective estimates, tends to introduce an element of uncertainty and bargaining which may reduce the incentive value.

5. What other incentives can be effective in the work-situation?

There are certain satisfactions in the immediate job—in the exercise of skill, in the creation of useful or beautiful objects, in the prestige which attaches to a job or in the physical and social surroundings at work which can act as an incentive. These may frequently be sufficiently strong to encourage an individual to put out considerable effort to remain in a particular job or with a particular working group.

6. Has the purpose of a job no importance as an incentive?

A great deal of the most devoted work is done because the individual is fired by its purpose or its usefulness to other people. As an incentive this can on occasion outweigh the remuneration of a job, or the conditions in which it is done. In ordinary industrial work, however, this is not likely to happen, nor is it desirable that it should. Nevertheless, without some awareness of the purpose or meaning of his job, there will always be a gap in the individual's incentive-pattern.

7. What are the general conditions to be satisfied if we are to maximize the incentive in any particular job?

We must think, not in terms of one single incentive, but rather of a pattern to which different motivations in different people, or in the same person at different times, will respond. This pattern will include—

(*a*) Attention to the money incentive so that the individual's standards are fairly met and that he feels he is adequately remunerated for extra effort.

(*b*) Attention to the physical and social surroundings of the job so that the individual finds adequate satisfaction in the daily routine of work.

(*c*) Attention to the purpose and meaning of work so that the individual may derive satisfaction from doing something useful to other people.

A great deal of this depends on adequate vocational selection.

CHAPTER XVI

WORK STUDY AND WORKING METHODS

In 1878 a young American, born of middle class parents and apprenticed as a pattern-maker and machinist, was employed by the Midvale Steel Company as a labourer. After a time he was promoted to gang-boss or foreman and was put in charge of a machine-room. His name was Frederick Winslow Taylor.

When he was appointed the men said to him in effect—"Now you know how we work here. We have our own time for each job, which we reckon represents a reasonable day's work. We keep to these times and if anyone looks as though he wants to work a bit harder we tell him to slow down, and not show the rest of us up—or else! You're a sensible chap and you wouldn't want to make trouble by trying to get things done any faster than our usual speed, so you just keep to the rules and we'll all get along fine." But Taylor didn't see it like that. In his view the accepted speeds represented about a third of a reasonable day's work and as he now considered himself a member of the management staff he felt it his duty to try to raise the output to a higher level. "All right," said his men, "If that's the way you want it, don't say we didn't warn you."

The following three years saw a conflict between the two. Taylor would stand over a man and time the job he was doing to find out how long it should take. He would establish by close supervision what a reasonable day's output should be, but as soon as he moved away the operator would either stop work or fritter time away to keep his production down to the old rate. If he was prevented from doing this he would cause his machine to break down by a piece of sabotage, in order to prove that it could not be safely run at a higher speed. When Taylor found that he could not get the output he wanted from existing workers he took on new men and trained them himself until they were actually producing the output he thought possible. As soon as they came in contact with other workers, however, they were forced down to the old rates of output. Meanwhile Taylor himself was subjected to every kind of social pressure from his workers to give up trying to reach the standards he was aiming at.

THE RESULTS OF TAYLOR'S EARLY WORK

At the end of three years, however, he had succeeded in raising the output substantially and in many cases doubling it. His success was due, in his own opinion, to two factors neither of which, rather surprisingly, was directly connected with the work-situation. The first was that he did not live in the working class district and that consequently the other workers could not get at him by bringing pressure to bear on his wife and children in the way they could do with other foremen. In the second place, as he was not of working class parentage he was better able to retain the confidence of the owners of the business when he asserted that breakdowns were due to sabotage and not to overdriving the machines as the workers claimed.

This early experience of Taylor's, which he has set out himself in some detail, throws rather a lurid light on the situation in an American company over seventy years ago. But though he had achieved his object, the bitterness and conflict it aroused disturbed him profoundly. Moreover, he was far from convinced that under the existing methods of piece-work payment it was to the worker's own advantage to raise his standards of production. He was led to reflect on the methods of management and the whole approach to industry on which they were based, and he concluded that it was unsatisfactory to rely on a worker to call out all his initiative, skill and knowledge in an effort to yield the highest possible return for his employer, even though a strong incentive was held out to him to do so.

Taylor felt that management must take much more responsibility for finding out the most effective way of doing a job, finding and training a suitable man in this method, and ensuring by adequate supervision and planning that he was able to put these methods into practice throughout the day. He began to put this new approach into operation and in 1898 he had an opportunity to put his ideas into practice on a large scale, in what has since become his best-known work, at the Bethlehem Steel Company.

The Pig Iron Handling Study

Briefly the situation was this. Eighty thousand tons of pig iron had been lying in a field adjoining the works because the price was too low to make it worth while collecting for sale. The outbreak of the Spanish-American war, however, raised the price of metals so that it became an economic proposition to load these pigs on to railway trucks and sell them. This was being done by a gang of seventy-five handlers who were moving about 12½ tons each per day on the average. The individual pigs weighed 92 lb. Following out his theory, Taylor made a study of the job and worked out what he thought was the most efficient and practicable method of lifting and carrying, and the best periods to work and rest. According to his calculations a man working on this plan ought to load 47 tons a day.

The next step was to find a suitable man and train him in the method. A strong and rather dull labourer named Schmidt was chosen and persuaded to follow out the detailed instructions of Taylor's assistant throughout the following day. The work then started with Schmidt being told "Now pick up that pig, walk to the truck, drop it, and walk back. Pick up another, carry it to the truck; now sit down and relax. Now walk back," and so on. This continued throughout the day and by knocking off time Mr. Schmidt had loaded 47½ tons and earned 70 cents more than he had done before.

Now the whole point of this study is not that the amount loaded in a day rose to nearly four times the previous figure. It is rather the dramatic proof of Taylor's contention that if management undertakes what he considered were its proper responsibilities for methods, selection, training, supervision, and planning, the resulting levels of output will show how low are the traditionally accepted standards built up by workers finding their own methods and picking up the job by themselves. It also provided a starting-point for a whole series of developments in which departments were reorganized on a basis of adequate methods studies. An example will be found in the yard gang which was responsible for loading and unloading quantities of different materials—ore, coal, ashes, etc. It is unnecessary here to go into the details of Taylor's studies of the most economical loads, the designs of shovels, the detailed organization of work, and so on, but the following figures show the situation before and after he took over—

	Old Plan	*New Plan*
Number of labourers	400–600	140
Average tons moved per man-day	16	59
Average earnings	$1·15	$1·88
Average cost per ton	$0·072	$0·03

The last figure (average cost per ton under the new plan) includes the additional expenditure on tools, supervision, and so on.

THE SIGNIFICANCE OF TAYLOR'S WORK

Many years have elapsed since Taylor opened up the subject of working methods and a whole literature has grown up about the methods of study. Not many people, however, have taken his point about the different approach and the new responsibilities to be accepted by management, and a rather unfortunate impression has been spread that he was a mere "efficiency engineer" only interested in speeding up work and quite indifferent either to the welfare of workers or to their share in the increased productivity. This is unjustified and one would do well to give more weight to Taylor's theories and less to the actual results that he achieved. This is not to say that his theories are necessarily correct, but they do represent one of the first attempts to think systematically about the methods and organization of work and consider where the responsibilities should lie.

If we accept, as is fairly widely agreed nowadays, that management should devise effective methods of work, rather than leave it to the operator to find out the best way for himself, then the first requirement will be a means of studying and recording working processes. Practically no work is static, for most jobs involve movement of some kind. If we want to find out what is being done, therefore, we may watch a series of more or less rapid movements, the earlier of which we may have forgotten before we come to the end of the task. Unless we have some means of recording the process we shall find it very difficult to consider the working methods, whereas if we can put down what is being done in some comprehensible form we can take our record away and study it at our leisure. There are many different kinds of task, on some of which the operator may sit still and perform fine manual movements while others may involve walking about and carrying out large movements of the arms and body. The same method of recording may not be suitable for both these kinds of job, so we must have a series of different methods which can be adapted to various tasks.

FLOOR PLANS

The first and simplest method of recording is to draw a plan of the room in which work is done and to trace the movements of the operator as he walks about it. This may be done either by continuous or dotted lines, though an even simpler method is to stick pins in at the various positions taken up by the operator and to wind a coloured thread from one to the other to denote the movements. A very simple floor plan is shown on page 196, for the familiar task of laying a table for six places.

The black line shows the first journey when the operator lays out a mat at each place, the line of dashes shows a second journey when the operator lays out a glass at each place, while the line of dots shows a third journey when the operator lays out the cutlery: three journeys covering in all probably something over thirty yards, each with six stops, the whole process being laid out quite clearly in this simple diagram.

Now as soon as this process is recorded it at once becomes obvious that the same ground is being trampled over several times, and one can scarcely look at such a plan without saying "Are all these journeys really necessary?" The recording process at once shows up a simpler method which would be to put all the things required on a tray or trolley and lay out each place completely in one act, probably also making only one stop on the longer side of the table to lay out the two places from the same position.

Once we get such a job down on paper, therefore, it becomes immediately obvious that it can be done in one journey of, say, ten yards with four stops.

Floor plans can be used wherever the movements of operators of materials about a room have to be recorded. A more complex example is shown in Fig. 27 in which the progress of

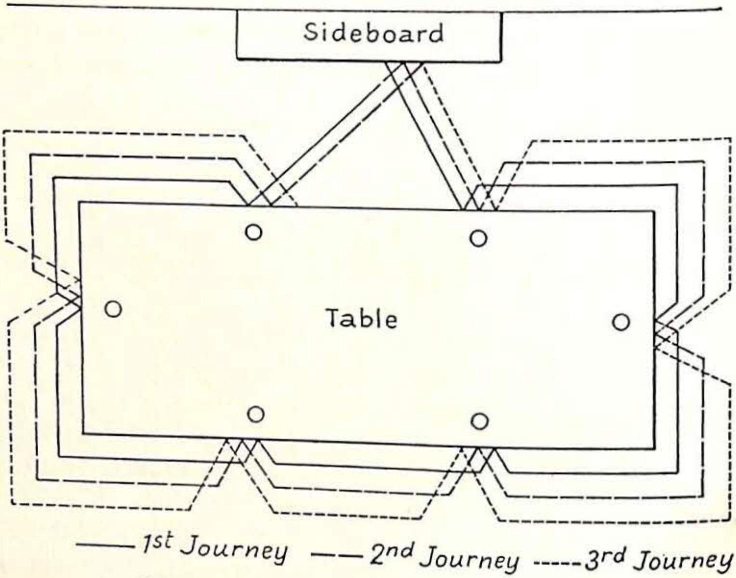


Fig. 25. Floor Plan for Laying a Table

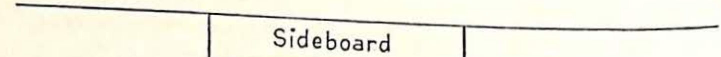


Fig. 26. Floor Plan for Laying a Table
(Improved Method)

a garment in an imaginary making-up factory has been traced. The reader may amuse himself by considering how many of the moves are unnecessary and how the distance travelled could be cut down. Such plans are essentially simple and need not detain us long.

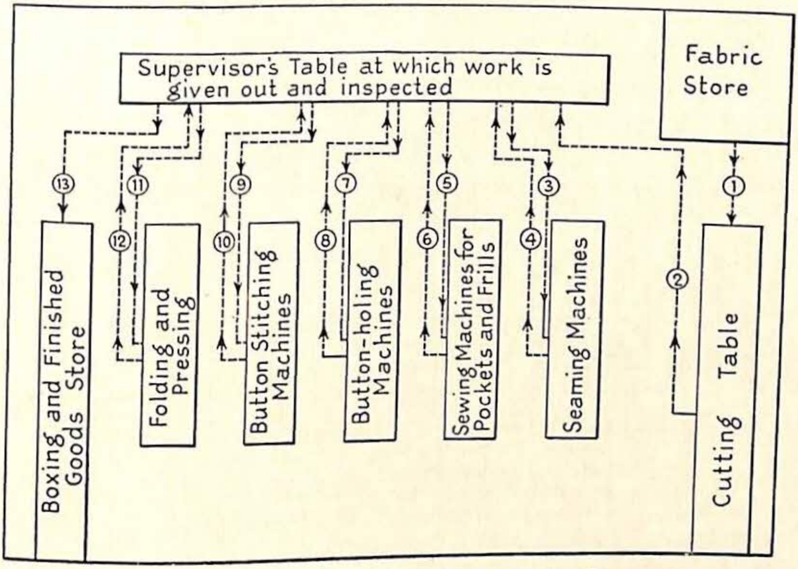

Supervisor's Table at which work is given out and inspected
Fabric Store
⑬
⑪
⑨
⑦
⑤
③
①
⑫
⑩
⑧
⑥
④
②
Boxing and Finished Goods Store
Folding and Pressing
Button Stitching Machines
Button-holing Machines
Sewing Machines for Pockets and Frills
Seaming Machines
Cutting Table

FIG. 27. FLOOR PLAN OF IMAGINARY GARMENT FACTORY

1. Fabric to cutting table for cutting out.
2. Cut out garments to supervisor's table.
3. Garments to seaming machines for main making-up process.
4. Back to supervisor's table for inspection.
5. Garments to stitching machines for pockets and frills.
6. Back to supervisor's table for inspection.
7. Garments to buttonhole machines.
8. Back to supervisor's table for inspection.
9. Garments to button-stitching machines.
10. Back to supervisor's table for inspection.
11. Garments to presses for finishing and folding.
12. Back to supervisor's table for inspection.
13. To finished goods store.

PROCESS CHARTS

By themselves, however, floor plans tend to be rather uninformative and at times they can become confused when so many movements have to be recorded that the lines become superimposed one upon another. Some form of legend is almost always necessary to describe the sequence of operations and perhaps to record times and distances in more easily comprehensible form. Such legends will develop naturally into process charts in which the use of a few symbols will be an aid to clarity. These symbols and a simple layout of a chart are as follows—

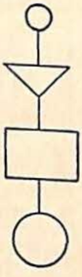
Symbol	Meaning	Columns for	
		Time	Distance
	Transport		
	Wait or Store		
	Inspect		
	Operation		

FIG. 28. SYMBOLS FOR PROCESS CHART

The making-up process shown in Fig. 27 could be recorded by the means given in Fig. 29.

Here again the recording method is essentially simple and can be adapted to most kinds of work. Whenever the symbols for "Transport" and "Wait" appear too frequently one's attention is immediately attracted and one begins almost automatically to ask whether these stages could be dispensed with.

RIGHT- AND LEFT-HAND CHARTS

Floor plans and process charts used separately or in conjunction with one another will enable one to record most jobs where movement about a room is involved. They are of little use, however, in jobs where the operator is sitting still and doing a job by hand. In such cases we shall want to record what each hand is doing in some detail and we shall probably need a rather finer time-scale. A rough sketch of the layout of the bench will be found useful in such cases, accompanied by a right- and left-hand chart of

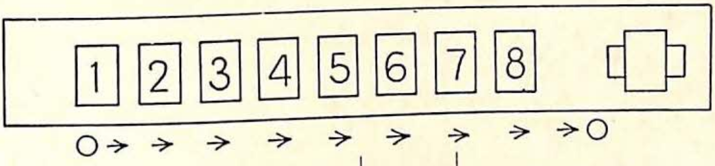
Operation		Description	Time	Distanc
1.	○	Fabric brought into fabric store		10 yd
2.	▽	Remains till wanted for cutting	variable	
3.	○	To cutting table		15 yd
4.	◯	Laid out and cut to pattern	20 min	
5.	○	To supervisor's table		20 yd
6.	□	Checked before giving out for sewing	5 min	
7.	▽	Wait till machine ready	variable	
8.	○	To seaming machine		15 yd
9.	◯	Long seams stitched	10 min	
10.	○	Back to supervisor		15 yd
11.	□	Checked	5 min	
12.	▽	Wait for stitching	variable	
13.	○	To stitching machine		12 yd
14.	◯	Pockets, belt, trimmings stitched	10 min	
15.	○	Back to supervisor		12 yd
16.	□	Checked	5 min	
17.	▽	Wait for buttonhole	variable	
18.	○	To buttonholing machine		10 yd
19.	◯	Positions marked out		

FIG. 29. PROCESS CHART FOR MAKING-UP OPERATION
(See Fig. 27)

Operation		Description	Time	Distance
20.	◯	Buttonholes stitched	3 min	
21.	○	Back to supervisor		10 yd
22.	□	Checked	3 min	
23.	▽	Wait for button machine		
24.	○	Taken to button machine		12 yd
25.	◯	Marked out	2 min	
26.	◯	Buttons stitched	2 min	
27.	○	Back to supervisor		12 yd
28.	□	Checked	3 min	
29.	▽	Wait for folding and pressing	variable	
30.	○	Taken to folding table		15 yd
31.	◯	Pressed	3 min	
32.	◯	Folded	2 min	
33.	○	Back to supervisor		15 yd
34.	□	Checked	2 min	
35.	○	Taken to finished-goods store		20 yd
36.	◯	Boxed	2 min	
37.	◯	Labelled	1 min	
38.	▽	Wait in finished-goods store	variable	

FIG. 29.—(*continued*)

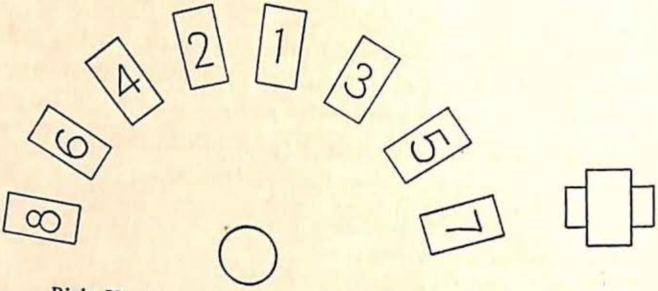
which the following is an example, showing a clerk paging a report—



Right Hand		*Left Hand*
Reach for and pick up Sheet 1 Transfer to left hand		Hold Sheet 1
Reach for and pick up Sheet 2 Transfer to left hand	5 sec	Add and hold Sheet 2
Reach for and pick up Sheet 3 Transfer to left hand		Add and hold Sheet 3
Reach for and pick up Sheet 4 Transfer to left hand	10 sec	Add and hold Sheet 4
Reach for and pick up Sheet 5 Transfer to left hand		Add and hold Sheet 5
Reach for and pick up Sheet 6 Transfer to left hand	15 sec	Add and hold Sheet 6
Reach for and pick up Sheet 7 Transfer to left hand		Add and hold Sheet 7
Reach for and pick up Sheet 8 Transfer to left hand	20 sec	Add and hold Sheet 8
Jog sheets together		Jog sheets together Lay down sheets

Fig. 30. Right- and Left-hand Chart A

When we look at this diagram two things become obvious. In the first place the operator has to walk backwards and forwards to pick up the sheets, and secondly her left hand is doing little more than acting as a clip to hold the sheets. Now it would be quite possible to rearrange the sheets so that walking becomes unnecessary, and, of course, if the operator were standing still in one place, she might as well sit down. Likewise if she laid down the sheets in front of her she might use both hands to pick them up. Thus a short study of the first record suggests the following changes—



Right Hand		*Left Hand*
		Reach for and pick up Sheet 8 Lay in folder
Reach for and pick up Sheet 7 Lay in Folder		
		Reach for and pick up Sheet 6 Lay in folder
Reach for and pick up Sheet 5 Lay in folder		
	5 sec	Reach for and pick up Sheet 4 Lay in folder
Reach for and pick up Sheet 3 Lay in folder		
		Reach for and pick up Sheet 2 Lay in folder
Reach for and pick up Sheet 1 Lay in folder		
Lift out and jog sheets		
Lay down	10 sec	Lift out and jog sheets
		Begin again

FIG. 31. RIGHT- AND LEFT-HAND CHART B

Right- and left-hand charts can be made much more detailed, the movements of the fingers included if this is considered desirable. There are very few cases, however, where it is really helpful to go into a great deal of detail and if this appears to be really justified probably the most effective method is to use a ciné-camera and record the actual movements on a film. With the addition of a flashing light bulb to provide a time-scale this will give a complete record of the movements. Further refinements are to strap little flashing lights on the hands or fingers so that the paths of movement may be more easily traced.

MAN-MACHINE CHARTS

In many kinds of job a large part of the work may be done by a machine which can work for periods with little or no supervision, the operator being only concerned with putting in the material, setting the machine, and starting it up. To find out the relative times when the operator and the machine are actually at work the following type of chart may be used. Idle times are shown by the shaded portions.

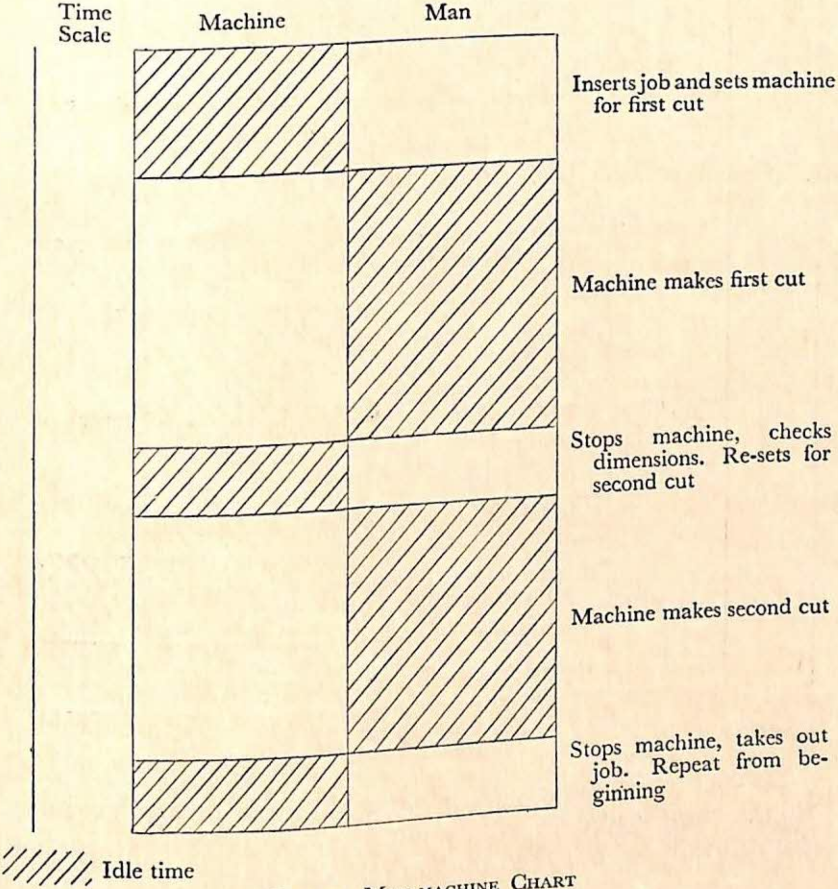


FIG. 32. MAN-MACHINE CHART

It is obvious here that more than half of the operator's time is unoccupied. Provided that the actual working of the machine does not require close supervision, the job could be laid out so that the operator looks after two machines.

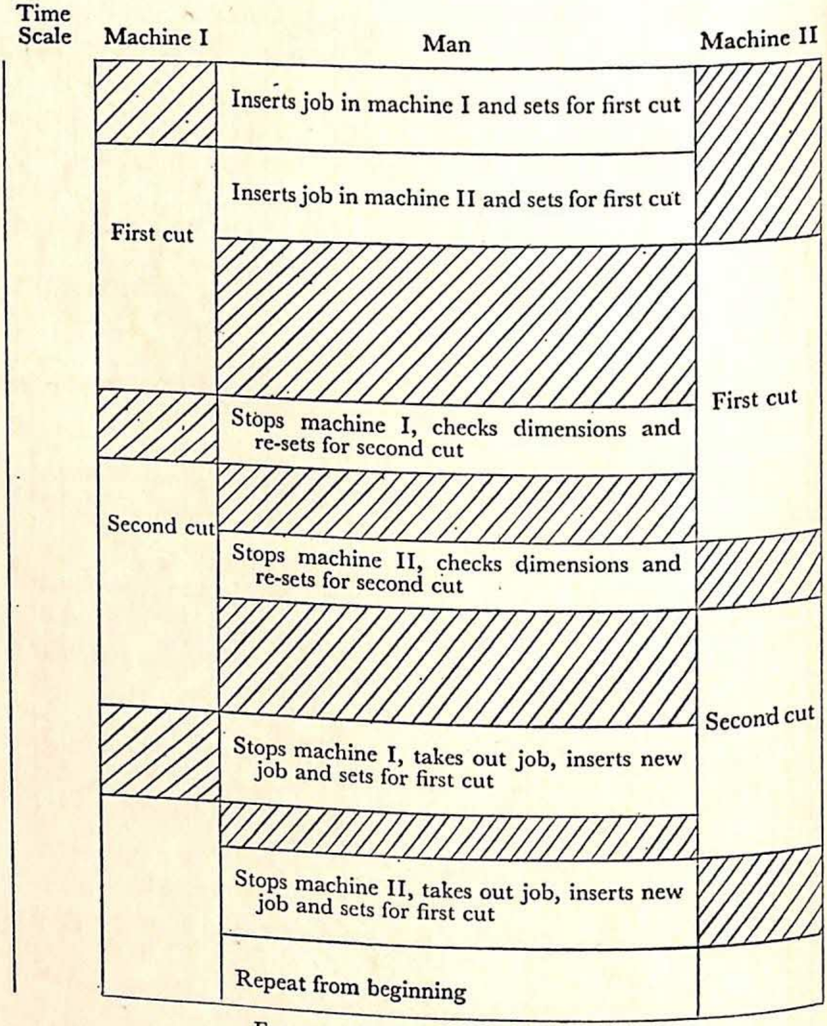

Time Scale
Machine I
Man
Machine II
Inserts job in machine I and sets for first cut
Inserts job in machine II and sets for first cut
First cut
Stops machine I, checks dimensions and re-sets for second cut
First cut
Second cut
Stops machine II, checks dimensions and re-sets for second cut
Second cut
Stops machine I, takes out job, inserts new job and sets for first cut
Stops machine II, takes out job, inserts new job and sets for first cut
Repeat from beginning

FIG. 33. MAN-MACHINE CHART
(New Method)

By such a rearrangement two machines can be kept running at the same speed as one, while the operator's idle time is cut down, though it does not entirely disappear.

MULTI-MAN CHARTS

Perhaps the most useful type of recording method is that which enables the work of several people on a common task to be put down. An example is given in Fig. 34.

Seconds 0	No. 1	No. 6	No. 2	No. 4	No. 3	No. 5
T	To pump controls at A	To back of pump near A	To front of pump B	To front of pump C	To suction hose at D	To suction hose at E
I	Fix one front sprag	Fix other front sprag	Uncouple from lorry and fix near sprag	Help No. 2 uncouple and fix sprag	Lift 1st suction to position with No. 5. Go for 2nd suction at D	Lift 1st suction to position with No. 3
M E	Get spanners, loosen suction blank cap and take it off	Pull out 2 delivery pipe blank ends	Go to E not D, see No. 5 later	Go to E	WAIT FOR NO. 5	Go for 2nd suction at E
10	Set pump controls for start by No. 5 and regulate engine	Take hose ends from Nos. 2 and 4: plug in	Get 1 delivery hose, go to No. 1. Give him end of hose, run hose G to L	Get 1 delivery hose, go to No. 1. Give him end of hose, run hose F to K. (Cross to K, being ahead of No. 2)	Lift 2nd suction to position with No. 5	Lift 2nd suction to position with No. 3
					Go to pump at D	Go to pump at B
	Couple 1st suction to pump, and 2nd suction to 1st with help of No. 6	Help No. 1 with suctions and tighten up	Run back to E for jet	Run back to D for jet	Get 1 delivery hose, run to L with it and couple to 1st length. (Cross to L because ahead of No. 5)	Start pump on crank
			Take jet to J	Take jet to H		Go to D. See No. 2
						Get 1 delivery hose, run to K with it, couple to 1st length
20	WAIT	Suction end in water			Run hose L to J	
	Prime pump	Stand by to help anyone in difficulty	WAIT FOR NO. 3	WAIT FOR NO. 5		Run hose K to H
S	On valve to jet J		Give jet to No. 3		Fit jet	
C	On valve to jet H		Stand by with No. 3 on jet J			
A	On cooling water			Give jet to No. 5		Fit jet
L 30	Regulate pump and stand by		WATER ON J	Stand by		Stand by
E				WATER ON H	WATER ON J	WATER ON H

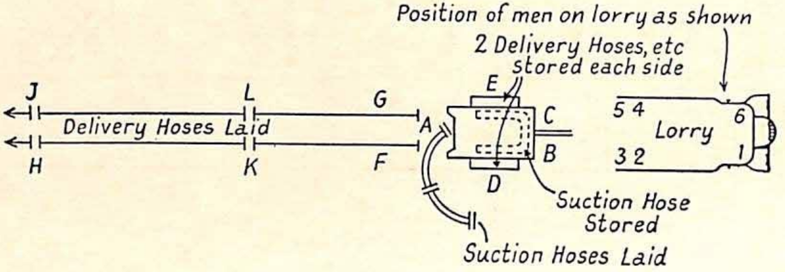


FIG. 34. MULTI-MAN CHART
Example—Six-man crew on a trailer fire pump.

THE IMPORTANCE OF ADEQUATE RECORDING

It has already become apparent that when we make a record of what actually happens in many jobs we see at once that there is unnecessary movement, transport, or waiting. This is not due to idleness on the part of the worker or to any deliberate intention on his part to be inefficient. It is rather the result of seeing the job as a series of incidents which happen one after the other. This is the view that most of us get when we are actually engaged in a task, and it ensures that our attention is so absorbed by the actual detail of the operations that we do not notice how often we walk across the same piece of floor carrying one article and then another. It is only when we can get away from the details of a task and study it as a whole that we have any opportunity to observe the method rather than the end to be achieved.

When, by using the appropriate recording method, we can lay out the job in front of us and study it at leisure, ways of economizing time, movement and transport show up at once. Three separate journeys to carry articles which could be taken in one journey on a tray, goods piled up awaiting inspection while machines are idle, one-handed movements while the other hand is used to clip or hold—these and similar things force themselves on our attention and set us thinking of how they could be overcome. And once we start thinking we shall in most cases find that a very simple answer lies ready at hand.

Students would be well advised to concentrate first and foremost on these simple and obvious inefficiencies. There is a time for detailed study as we shall see in a moment, but it is important to remember that such studies tend to yield diminishing returns. Reverting to the example of paging a report, we found that a glance at the right- and left-hand chart of the first method showed two gross wastes of movement—the operator walking back and forth, and using her left hand as a clip. By dealing with these, the time required to do the job was reduced from 20 to 10 seconds and the operator was spared the fatigue of standing and walking. Dealing with the most obvious wastes, therefore, cut the time by 50 per cent—a very satisfactory saving. But it is possible still further to simplify the job by devising gadgets which enable operators to pick up two sheets at a time. These cost something to make and operators require a little training before they can use them efficiently. They result, however, in the saving of an additional three seconds—not a very impressive return for the time and material expended when compared with the ten seconds saved by ten minutes' thought and a simple rearrangement of the sheets.

It is very advisable, therefore, to concentrate on the opportunities for gross savings which many studies will reveal as soon as a record is made of what is actually being done at present. Only when one is fully convinced that all these simple and obvious savings have been made is it advisable to go into greater detail.

MOVEMENT STUDY

When we do turn to the detailed methods of work, however, we shall find that the human body has certain potentialities and limitations and that tasks which fall within these limitations can be carried out much more conveniently than those which disregard them. Think, for example, of the cinema organist with his four keyboards, dozens, or perhaps scores of stops, and a set of pedals below his feet. He can bring all kinds of effects into play without difficulty because all these controls are arranged so as to be within easy reach of his two hands and two feet. The comedian, on the other hand, who makes us laugh by a series of comic mishaps while papering a room or laying a carpet, does so by attempting to reach tools which are too far away, by awkward movements when he is off balance, and by losing control of his material because he has failed to fix it adequately in the working position.

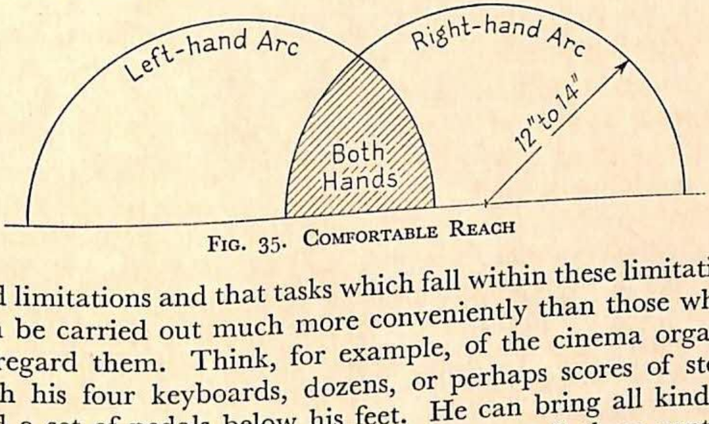


FIG. 35. COMFORTABLE REACH

Looking, then, at the human body from this point of view, we shall find at once that the parts best adapted for most kinds of work are the hands. When standing or sitting at a flat table or bench the hands will rest naturally on it about fourteen inches apart. If the student will take a piece of chalk and draw the following lines he will learn at once the main limitations of his hand and arm movements.

1. Take the chalk in the right hand and draw a circle pivoting from the elbow, and keeping the upper arm motionless.

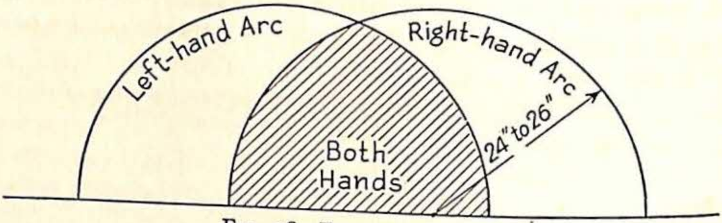


FIG. 36. EXTREME REACH

2. Repeat with the left hand.

This will result in two arcs roughly like those in Fig. 35, each with a radius of about a foot to fourteen inches.

Each arc shows what is a comfortable reach for the right and left hand while the shaded portion shows the area covered by both hands.

3. Take the chalk again in the right hand, and draw a circle at full stretch from the shoulder.

4. Repeat with the left hand.

This will result in two more arcs, each with a radius of about two feet, as shown in Fig. 36.

Each arc shows the maximum reach for the right or left hand, the shaded area being covered by both.

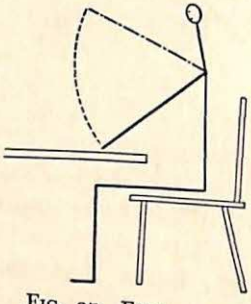


FIG. 37. ELEVATION

The next stage is to stretch the hands to the full reach of the arms on the bench and then raise them as high as they can go. The result seen in elevation in Fig. 37 shows another aspect of how the body can be most easily utilized.

Bench Layout

With these dimensions in mind it is easy to see how work to be done by hand can best be laid out on a bench. What has to be done by two hands should occupy the shaded portion, roughly triangular in shape, with a side of twelve to fourteen inches in front of the operator. The components and tools required frequently should be arranged along the right and left arcs at about a foot radius from the elbow, while those less frequently required should be laid out on the outer, maximum-reach arcs or perhaps on shelves above. The diagram below shows this in general outline. Differences of operator size may have to be allowed for but these will rarely be more than a few inches.

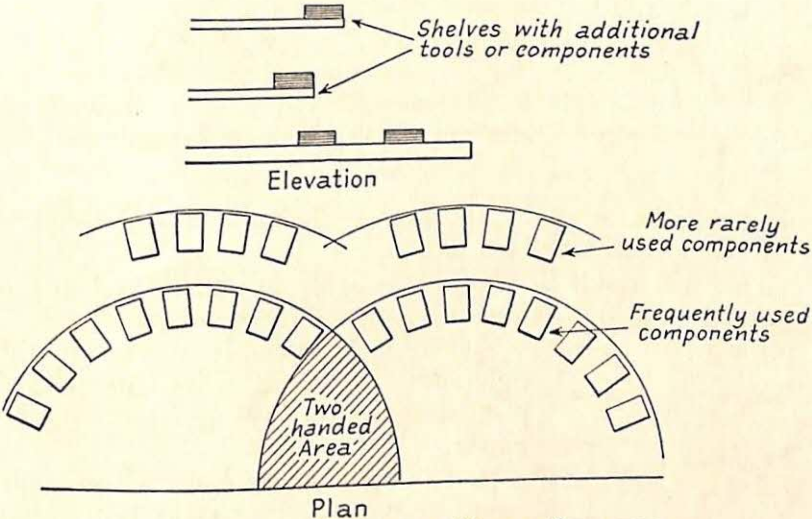

Shelves with additional tools or components
Elevation
More rarely used components
Frequently used components
Two handed Area
Plan

FIG. 38. BENCH LAYOUT FOR MANUAL OPERATION

Other dimensions such as the height of the bench from the floor for comfortable standing or sitting, or the location of pedals or foot controls will be important, but these can be ascertained by taking a few simple measurements. In this way a suitable layout for manual operations can be worked out from first principles in a very short time. The reader will probably already have been struck by the resemblance between the layout thus arrived at and the cinema organ, which we used as a starting illustration.

In considering other kinds of work, such, for example, as those which involve machine controls, we should always start with a consideration of the human body. If the operator has to stand he will have to rely on his hands and arms, and we have already seen something of the comfortable and extreme reach of these and hence the positions and distances within which controls should lie. If the operator sits he may use his feet and legs as well, provided the controls or movements he has to make fall within comfortable reach. Much the same applies to dials or other visual indicators; to be easily read these must be placed so that they can be seen without turning the head.

Easy and Difficult Movements

But once the layout of the work position has been adequately dealt with we still have to deal with the question of easy or difficult movements. Again the reader may provide himself with an illustration by placing a pile of books on the desk in front of him, with the top one projecting a couple of inches over the others. Take a pencil or rubber in the right hand and tap the top book. You will find this quite an easy natural movement and you will have no difficulty in exerting considerable force if you want to. But now try to tap the underside of the top book where it projects over the others. You will find this very much more awkward and it will be difficult to exert much force or hit hard.

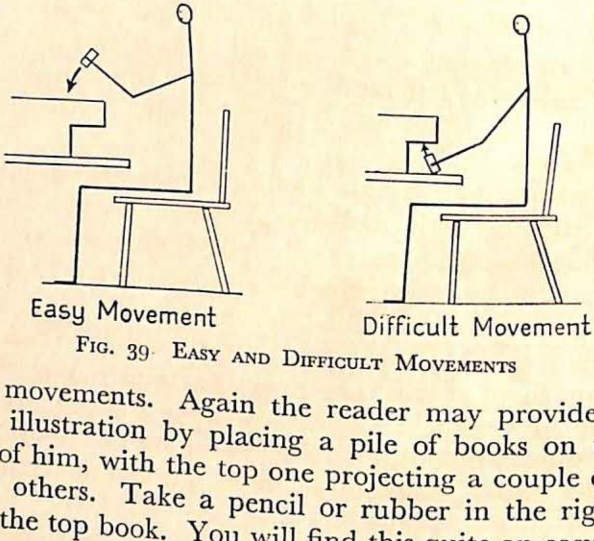


FIG. 39 EASY AND DIFFICULT MOVEMENTS

We need not spend long considering why one movement is easier than another, for it is quite obvious that one gives a free swing, allows the operator to get the greatest "mechanical advantage" from his body, and so on. The fact remains that one is a natural, effective movement while the other is cramped and difficult and we only have to try them out to recognize at once which is which. This applies to any movement; if we try it we shall quickly find out if it is easy or difficult.

There are a few principles of effective movement which sum up the experience anyone may provide for himself with a few trials. For example—

1. Movements of the arms should be in opposite and symmetrical directions, and they should be made simultaneously. For example, take a book in both hands and swing it rapidly from left to right in front of you. Then take a book in either hand and swing them in opposite directions starting with both together in front of you, outwards and in again, rapidly several times. You will feel at once which is the easier movement.

2. Hand movements should be confined to the "lowest classification," i.e. don't use a hand if you can do the job with one finger, don't move your elbow if you can do it with a wrist movement, don't move your shoulder if you can do it from the elbow.

3. Momentum and rhythm should be encouraged wherever possible. Niggling little movements which involve continual starting and stopping and careful positioning are much less effective than the free swinging movements which a coal heaver uses when filling a cellar through a manhole. Such workers drop the first two sacks beside the hole, then swing the remainder down on them so that they empty themselves. In this way the weight of the sacks themselves does quite a lot of the work, and they can be thrown down without positioning while the operator has a series of swinging curved movements to perform.

4. Fixed positions should be provided for tools, materials, etc. We have already seen how these should be placed so as to be accessible with the minimum waste of motion. If in addition each item is located in a special place it can be picked up without searching or fumbling.

THE DANGERS OF SPECIALIZATION

The detailed study of this subject has grown up in recent years into the science of "ergonomics," and an increasing amount of research is being carried out into the potentialities of the human sensori-motor equipment. Much of this is directed to the design of machines and equipment with the aim of making them easier for human beings to work. Dials and other forms of display can be laid out so as to make it easier for the human senses to take in the information they present, while levers and other controls can be so positioned as to require the minimum of movement and effort, or to facilitate greater sensitivity in their operation. But while these detailed and specialized researches undoubtedly have their place, it is important that they should not be allowed to obscure the contribution that can be made by the intelligent layman using no more than a simple method of systematic observation.

It is fatally easy to make movement-study sound difficult and complex by unnecessary theorizing, just as it is very tempting to devise impressive-looking gadgets which are supposed to make a task easier when in fact they complicate it. Work is at its most efficient when the tasks are simple and straightforward, the movements easy and natural, and the tools and controls handy and light to operate. One should always keep such an ideal in mind and direct one's effort and attention towards dealing with anything which interferes with it.

As has been pointed out above, the key to the situation is recording. Once we have a job down on paper we may study it at leisure and go over the various parts of it in as much detail as we wish. Once we do this it is almost impossible to miss the points where unnecessary, ineffective or fatiguing movements are taking place. There is no difficulty in recognizing such movements, for if one is in any doubt one may try them oneself. This will show at once whether they are easy or awkward.

Devising a better method is usually the easiest part of the task. The difficulties begin when one has to get it accepted and cope with the rearrangements necessary to fit it into the existing organization of production. People naturally dislike change, and quite apart from suspicion of the motives of management, disturbance of established routines will be unwelcome.

Finally, let it be emphasized again that the law of diminishing returns operates very markedly in this field. A simple rearrangement to cut out gross and obvious wastes of effort may effect a 30 per cent saving. An expensive gadget which involves long and difficult training of operators in its use may result in a 5 per cent saving. Only when one is convinced that all the gross and obvious savings have been made is it advisable to spend time and effort on the finer points.

SUMMARY

1. What is the significance of F. W. Taylor's work?

By his experience in raising production rates from their traditionally low levels in the Midvale Steel Company in 1878, Taylor was led to reflect that management which relied only on stimulating the initiative of the worker by a strong incentive was wrong in principle. He contended that management should accept the responsibility for working out the best method, selecting suitable workers and training them in it, and planning the work so that these methods were actually put into effect on the job. His work in the Bethlehem Steel Company showed what can happen in practice when this theory is put into operation.

2. What is the first and fundamental step in any study of working methods?

It is essential to begin with a record of what is actually being done in a form which can be taken away and studied at leisure. Only then can we consider what actually happens and find out where unnecessary effort or delay is involved. So long as the job is only seen in progress we shall tend to miss important points because they are over before we have grasped what is taking place.

3. What are the uses of floor plans?

Floor plans enable a job to be recorded which involves much movement about the work place. Examples are shown in Figs. 25–7. Floor plans usually show that the same journey is being repeated more than it need be or that unnecessary journeys are being made.

4. What is a process chart and how is it used?

A process chart records a sequence of operations in detail with the times and distances involved. Examples are shown in Figs. 28–9. They are frequently used in conjunction with floor plans.

5. When are right- and left-hand charts necessary?

Whenever an operator remains in one place carrying out a series of manual operations, right- and left-hand charts are a useful means of recording. Examples are shown in Figs. 30–1. The most usual waste revealed by these charts is the under-employment of the left hand.

6. What is a man-machine chart?

Where an operator is tending a machine, a man-machine chart will show the relative times when each is occupied and at rest. Examples in Figs. 32–3.

7. What is a multi-man chart?

Wherever a number of people are involved in one task at the same time, a multi-man chart can be used to record the task of each individual and how it fits in with that of the others. Examples in Fig. 34.

8. What are the essentials of movement study?

The human body with its limbs and physical potentialities is equipped to carry out a certain range of movements within certain dimensions. These movements and dimensions are not difficult to ascertain. Movement study consists in so arranging a task that the movements it calls for are those which the human body is best adapted to make with the minimum of strain and fatigue.

9. What are the main characteristics of easy movements?

(*a*) Arm movements that are in opposite and symmetrical directions;

(*b*) movements in the lowest classification that will be adequate for the job;

(*c*) movements which make the maximum use of momentum and rhythm; and

(*d*) movements to and from fixed and known positions which are easily memorized.

10. What should be the characteristics of the ideal working methods?

They should be as simple as possible, free from strain and awkwardness. All gross wastes of time and effort should be avoided while at the same time complex gadgets which involve difficult re-training of operators should be refused unless they can be shown to contribute significantly to reducing effort and fatigue.

CHAPTER XVII

THE PHYSICAL CONDITIONS OF WORK

One aspect of work study which we have not so far touched on is the measurement of output rates. On a daily or weekly basis, of course, this is not difficult and in many companies such measurements are taken as a normal part of the wage-payment system. But if we can find out something about the fluctuations of output over shorter periods we shall provide ourselves with a means of studying the effect of different conditions in the work-environment. We may find that in certain situations the operator's speed increases while in others it tends to fall away. This will help us to determine the best conditions of work.

Where operators are on simple repetitive work with a short job-cycle, it is not difficult to establish a speed of output by noting the number of units produced in a given time. For example, with operators on a small assembly job which takes about thirty seconds we may check the output every five minutes. This will give us a rate, the number of assemblies produced per five minutes, as in the table below—

1st five minute period	8 assemblies produced
2nd " " "	8 " "
3rd " " "	9 " "
4th " " "	9 " "
5th " " "	9 " "
6th " " "	10 " "
7th " " "	10 " "
8th " " "	11 " "
9th " " "	11 " "
10th " " "	11 " "
11th " " "	11 " "
12th " " "	12 " "

Such a table will show the changes in the operator's speed of work during one hour, and it is obvious from a glance at the table that the speed is increasing. This will be made still clearer if we express the figures in the form of a graph (Fig. 40).

It is not always so easy to establish a rate of output because where the units produced take a considerable time, perhaps several hours, to complete, the period may be so long as to mask most of the fluctuations. In these circumstances we may have to subdivide the operation and use a smaller part as our unit of measurement. An example of this might be the weaving of a 50-yard piece of cloth. This may take too long a time to be useful as a measure of fluctuation in rate of output, but we can take instead each pick of the loom as our unit of measurement. Checking these each five minutes will show up any changes in speed of work.

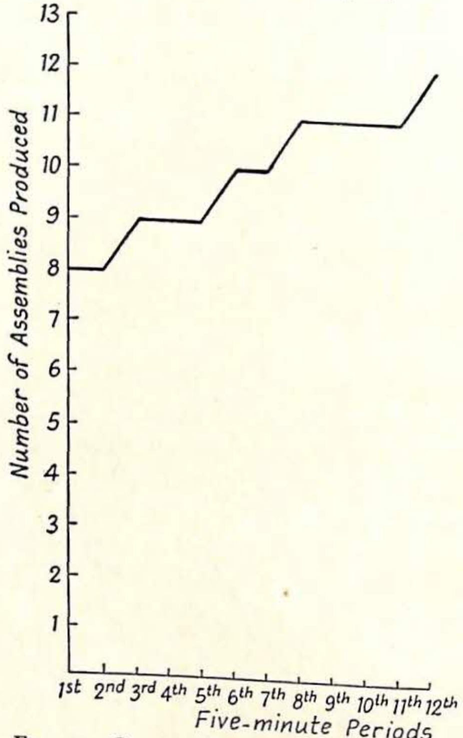


FIG. 40. OUTPUT CURVE—ASSEMBLY WORK

But in other types of work the rate of output may be controlled entirely by the process and consequently the variations will be of little value in showing the effect of conditions on the operator. In flying an aircraft, for example, the speed will be controlled to some extent by the state of the wind, the altitude, the weight carried, and possibly also by instructions from the ground. The distance covered every five minutes will tell us very little about the pilot or his reaction to conditions. Such cases, however, can be approached from another angle and we may note the occurrence of errors or unsteadiness as the journey proceeds. We might find, for example, that in the early stages the pilot applied just the right amount of rudder and bank on each turn while in the later stages he tended to apply too much or too little and had to make corrections to compensate for these errors. With a little ingenuity they might be reduced to measurable form, and in fact during blind flying training on an artificial machine set up on the ground with recording apparatus (a Link trainer) this has been done. Results like the following have been obtained—

1st Hour

1st	five	minute	period	0	errors
2nd	,,	,,	,,	0	,,
3rd	,,	,,	,,	0	,,
4th	,,	,,	,,	0	,,
5th	,,	,,	,,	1	,,
6th	,,	,,	,,	0	,,
7th	,,	,,	,,	1	,,
8th	,,	,,	,,	1	,,
9th	,,	,,	,,	1	,,
10th	,,	,,	,,	2	,,
11th	,,	,,	,,	1	,,
12th	,,	,,	,,	2	,,

2nd Hour

1st	five	minute	period	2	errors
2nd	,,	,,	,,	2	,,
3rd	,,	,,	,,	3	,,
4th	,,	,,	,,	3	,,
5th	,,	,,	,,	4	,,
6th	,,	,,	,,	5	,,
7th	,,	,,	,,	5	,,
8th	,,	,,	,,	6	,,
9th	,,	,,	,,	7	,,
10th	,,	,,	,,	8	,,
11th	,,	,,	,,	10	,,
12th	,,	,,	,,	11	,,

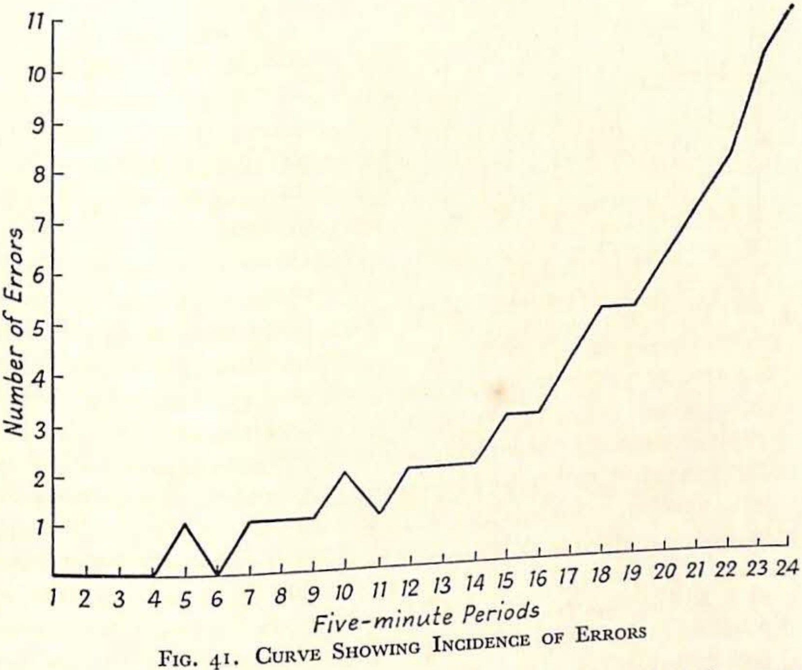


FIG. 41. CURVE SHOWING INCIDENCE OF ERRORS

Such a graph shows that during a two-hour period the rate of errors has increased, especially during the second hour.

PHYSICAL FATIGUE

Having provided ourselves with a means of measuring the fluctuations in a rate of output, we can now study the effect of various conditions on the operator. The first of these is fatigue, which in its simplest form is not difficult to understand. If we take one small group of muscles, such as those involved in moving a finger, and exercise them alone by pulling a weight attached to a string while the rest of the arm and hand is strapped down, we shall find that we can only pull the weight up to its full extent for a limited time. After a little our pull becomes shorter until finally we are physically unable to move the weight at all. The reason is that this group of muscles is suffering from complete physiological fatigue and is quite unable to make any further effort. After a rest the muscles will begin to respond again and we can once more move the weight, though this time we shall only be able to go on for a shorter time than before. This kind of fatigue, while interesting from the laboratory point of view, is of very little significance in ordinary life, because we very seldom use such small groups of muscles so intensively that they "pack up" completely.

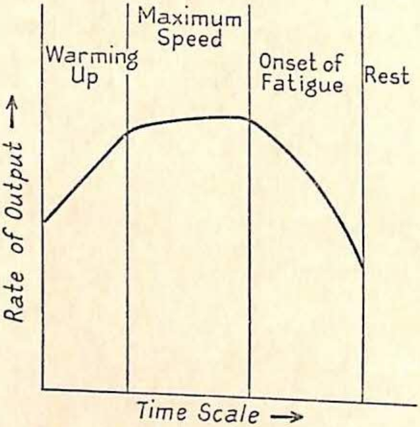


FIG. 42. WORK CURVE—FATIGUING WORK

What is more normal, however, in industrial life is the reduction of speed which occurs after a period of physical work, coupled with a disinclination to continue which never reaches a complete physical inability to do so. Take, for example, someone shovelling coal—a heavy, fatiguing task in which the speed could quite simply be recorded in terms of the number of shovelsful thrown per minute. The operator might start off fairly slowly, warm up as he got into the swing of it, keep going at his best speed for a period, then find the shovels becoming heavier and heavier. His speed would probably begin to drop a little at this point and the temptation to stop and rest would become increasingly strong until finally he knocked off for a little and leaned on his shovel while he wiped his brow. He would feel physically fatigued in the sense that he wanted to stop shovelling and rest for a period, but he would still be physically capable of going on as the appearance of a loud-voiced supervisor would quickly prove. The graph of fluctuations in the output rate is shown in Fig. 42.

If work was resumed after a rest the same process would be repeated except that this time both the warming-up period and the period of maximum speed would be shorter.

Such a graph is known as a "work curve" and the one in the diagram is fairly typical for heavy fatiguing work. It puts down on paper what anyone who has ever shovelled coal or sawn wood will recognize as the normal development of his feelings towards such an activity.

MONOTONY AND BOREDOM

There are, however, many kinds of work which do not involve physical fatigue, but in which output tends to drop off after a period. Repetitive, light assembly work is not fatiguing in the same way as shovelling coal, yet if we look at a work curve for this type of job we shall find a similar picture of falling speed though in this case it will be much more gradual, while we may find odd things like increases towards the end of the period.

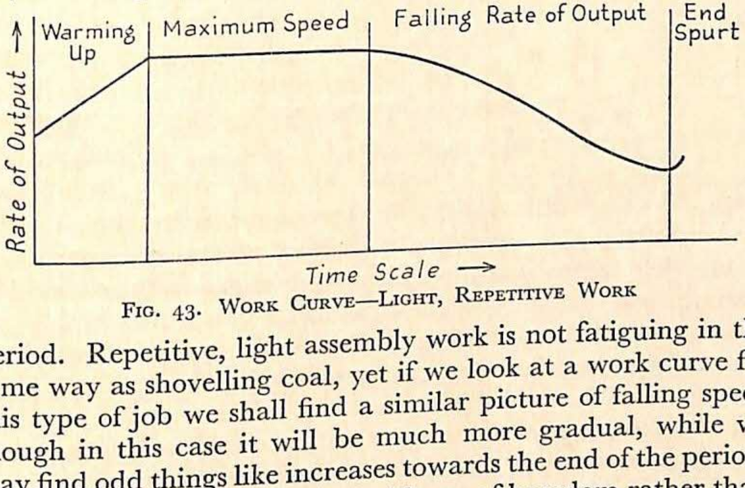


FIG. 43. WORK CURVE—LIGHT, REPETITIVE WORK

A curve like this shows the incidence of boredom rather than fatigue, the "end spurt" being due to the operator brightening up when the end of the period is known to be within half an hour or twenty minutes.

Work curves will vary according to the kind of work, those for fatiguing work being usually different in shape from those where the work is light physically but monotonous and repetitive. It is never safe to generalize about any job and one should always construct a work curve, or a series of work curves, before committing oneself to an opinion about how output is likely to fluctuate. Work curves are also liable to fluctuate with different individuals, so that it will usually be advisable to construct several curves for one job and then to note any general similarities they may display.

HOURS AND REST PAUSES

Once we have established a reliable work curve for a particular job we shall inevitably be led to consider whether anything can be done about the fluctuations. Think, for example, of the length of the working period. If the rate of output declines after fatigue or boredom sets in, then we are obviously going to gain a diminishing return after a certain point. The fourth hour will almost certainly produce less than the second hour, while if we add a fifth hour the extra production will be still less. There will come a point where the rate of output is so low that it barely justifies the additional time on the job.

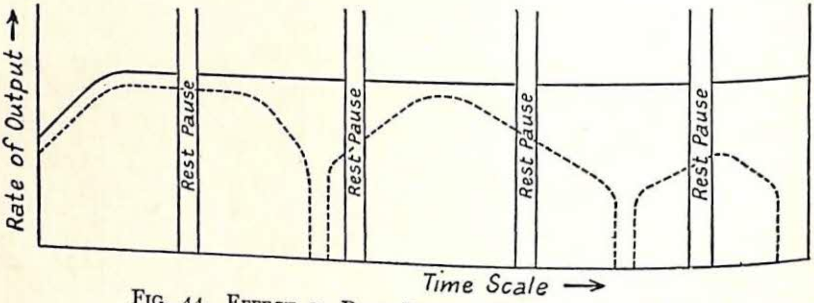


FIG. 44. EFFECT OF REST PAUSES—FATIGUING WORK

This decline in output rates as the work period lengthens can at times make long hours uneconomic. As far back as 1917 it was established that when excessive hours were reduced the drop in output was much less than had been expected, and in fact after a few weeks of readjustment the influence of the higher average tempo of production had caused total output to come back to the original figures. The same amount of work was being done, in fact, in a fifty-six hour week, as had been formerly done in a week of sixty-six hours.

Another example of the same amount being done in less time is provided by the introduction of rest pauses. If, on looking at a work curve, we note the point at which the output rate begins to drop and introduce a rest pause a short time before, we may offset the decline or postpone it. Fig. 44 gives an example of a physically fatiguing job of which the work curve normally follows the broken line, with unofficial rests being taken at irregular intervals. A new work curve with organized rest pauses is shown by the black line. The rate of work would thus be kept consistently higher by regularly spaced rests.

Next take the example (in Fig. 45) of a light job where the work curve shows the influence of boredom. The cross-hatched area represents the rest pause during which no work is being done so that the production rate drops to nil. It is thus lost time. The shaded area represents the gain in output which results from the higher speed of production. If the shaded area is larger than the cross-hatched area then the total output during the working period will be greater, even though ten or fifteen minutes have been lost through the introduction of rest pauses.

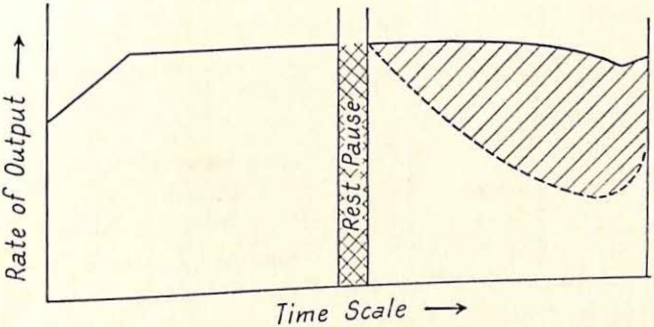


FIG. 45. EFFECT OF REST PAUSE—LIGHT, REPETITIVE WORK

OTHER METHODS OF DEALING WITH FATIGUE OR BOREDOM

The study of work curves will throw a great deal of light on the incidence of fatigue and boredom, and by calling attention to the points at which output rates tend to sag they lead one on to think about measures to offset these matters. Dealing with actual fatigue probably involves the reducing of the physical strain involved in heavy work by redesign of tools or equipment or by rearrangement of loads. Where such measures are not possible fatigue can be offset by the introduction of short rests as frequently as the work curves seem to indicate are advisable. Troops can march for very long periods when they are allowed a rest of ten minutes in the hour.

Dealing with boredom provides scope for a wide variety of expedients. Rest pauses, refreshments, "music while you work"—these have become accepted as normal at the present day, though thirty years ago they would have been regarded as immoral in many companies. Community singing goes on semi-officially in some workrooms and conversation may take place on a clandestine basis. Allowing operators to go home when the task is finished has in some cases had a very dramatic effect in speeding up the tempo and offsetting a sagging afternoon output rate by bringing forward and extending the influence shown in the "end-spurt." Reading improving literature used to be carried on in monasteries during working hours, and this might be useful in certain cases though it might cause some surprise at first, and would raise problems in the choice of literature. It is advisable, however, to keep an open mind and whenever a study of the work curves suggests that something might be done, experiments should be made and the results noted.

NOISE

The hours of work have been considered for convenience as part of the physical environment which surrounds the worker, and this has probably some justification. There are, however, other conditions which fall more logically under the heading of physical conditions. One of these is noise, and some studies have been made of the effect of noise upon output. The question, however, is complicated by the fact that very many different sounds fall under this heading. Noise can vary in intensity or loudness, and this can be measured in units (decibels) by the use of a sensitive microphone with a recording device. It can also vary in quality.

In every large city there is a more or less continuous hum of traffic noises which many people hardly notice. In factories also there are usually machine noises which go on all the time at a certain pitch. Quite often these can reach a considerable degree of loudness without their having any noticeable effect on production rates, while workers say that once they have got used to them they fall below the conscious level and are never thought of. Some studies have been made in very noisy shops such as weaving sheds where the rattle of the shuttles approaches the noise of small-arms fire, and very little difference was found between the output rates of workers supplied with ear-plugs to reduce the noise and those who were not. Individual differences between workers, however, were noticeable here.

Certain kinds of noise, however, do have an effect which can be seen in the rates of output. Loud insistent noises such as are produced by pneumatic drills or steam pile-drivers do put a strain on those who work near them particularly if the noises are intermittent. Talk of which enough is heard to make sense will also fall into this category, though a buzz of conversation in which no words can be distinguished may pass largely unnoticed. Noises of these kinds will show an effect on the work curve either by startling the operator or by distracting his attention, and as a rough guide we might lay down these two criteria to work on: if a noise neither startles by its loudness or quality nor by being intermittent, and if people can get used to it so that it does not distract their attention, it will probably have little effect on output rates.

LIGHTING

Another element in the physical environment is light. During the hours of daylight this will present few problems in workshops where there is plenty of window space and where the windows are kept clean. A guide to daylight lighting is to go to each workplace in a room in turn. If you can see the sky through some or all of the windows from each position then the daylight illumination is probably adequate. This is a very rough-and-ready guide and there will be exceptions, but in most cases it serves. To make a finer check one requires a light meter which registers in foot-candles the amount of light falling on its sensitive surface.

Artificial illumination, which may be called for during the hours of darkness, or where the natural lighting is insufficient, is however a different matter, one difficulty being the constantly rising standards. Some years ago it was possible to find factories where the overall illumination was dim and the light on the working point definitely inadequate, being perhaps as low as half a foot-candle. In those days five or ten foot-candles overall might have been considered very adequate illumination, and rises in the work curve were found when lighting was increased to that level. Nowadays, however, twenty foot-candles have at times been recommended as advisable and increases in output have been found when lighting was stepped up to that figure and even beyond. For certain jobs requiring fine discrimination, up to four hundred foot-candles (the equivalent of bright sunlight) have been tried and found worth while. For example, in the inspecting of soap tablets it has been found that with this amount of light on them any faults at once stand out, so that the strain on the operator is much reduced.

One element in the situation, of course, is the development of lighting apparatus. It was formerly quite an expensive business to raise the level of illumination with ordinary filament lamps. With modern fluorescent or mercury vapour lamps it has become possible to get a great many foot-candles for a comparatively small expenditure both in current and fixtures, and it seems likely that with improved facilities standards will rise still further, so that what is looked on as adequate artificial lighting today may in ten years' time be regarded as semi-darkness.

These same developments have also solved another problem, that of the quality of light. Very bright light from a single source tends to fatigue the eyes by its glare, while at the same time it casts very dark shadows. Modern fixtures cast a diffused light which does not glare nor throw dark shadows, so that these problems need no longer arise. Some fixtures, however, leave out certain colours in the spectrum, such as the reds and yellows, which has the effect of making human skins look remarkably pale and ghastly. Women workers at times object to this, particularly those who are unmarried and who bear in mind the possibility of a romance developing through social contact at work. When carefully applied make-up comes to look like black paint smeared on a corpse, as it does under certain kinds of lamp, they get discouraged and try to move to a job where their looks, natural or artificial, have a chance. These unfortunate effects, however, will disappear as research into lighting fixtures shows how they can be avoided without loss of illumination.

HEATING AND VENTILATION

The atmosphere of a workroom will remain comfortable so long as certain conditions are within the range of toleration. Outside that range there will be discomfort and grumbling, no matter whether they are above or below what is tolerable. There is a complication, however, for from this point of view comfort does not depend on one condition, but rather upon the interaction of three variables. These are—

(*a*) the temperature of the air;
(*b*) its humidity; and
(*c*) the rate of air movement.

Together they make up the "cooling-power" of the air and it is on this that our sensation of comfort depends. If it is too great, our bodies will lose heat quickly and we shall feel cold, whereas if the cooling-power of the atmosphere is too small it will not carry away the heat given off by our bodies and we shall feel uncomfortable.

Looking at the three components of cooling-power separately we need spend little time on temperature. This can be measured by an ordinary thermometer, and it can be raised by means of fires, radiators, and various heating systems with which we are all familiar. Lowering the temperature of a room when the outside atmosphere is very warm is rather more difficult though it can be done by various methods, including refrigeration. It is not a problem which crops up sufficiently often in this country, however, for us to deal with these methods in detail.

Humidity is the amount of moisture carried in the air in the form of vapour. It can be measured by wet and dry bulb thermometers.

Air movement means exactly what it says and is measured by a Pitot tube, the same instrument which is used for recording the speed of an aircraft by measuring the pressure of air against the end of the tube as it flies. Outside, the air is almost always in movement through the winds and breezes, while inside most rooms there are small draughts and eddies. When these rise above a certain speed they will cause us discomfort even though the day is quite warm. On a day which is actually cooler we may feel that the air is warmer simply because of the lack of movement.

A change in any of these three conditions will affect the cooling-power of the air. A drop in temperature will increase it and a rise will make it fall off. Low humidity means greater cooling-power while high humidity reduces it. Low air movement means low cooling-power while greater air movement results in higher cooling-power. The three conditions interact so that if the air is so warm and humid that its lack of cooling-power is causing discomfort this can be offset by increasing its movement artificially by means of fans.

Punkahs have been used for this purpose in tropical countries for many years. Conversely in cold countries, where the low temperatures make the air's cooling-power too great for comfort, people try to reduce draughts and eddies by double windows, stuffing up cracks below doors, and so on, in an effort to reduce the air movement and so cut down the cooling-power of the air.

Too high cooling-power and too low cooling-power will alike make themselves felt at work both in the operator's feelings of discomfort which will be expressed by grumbling, and in the low rate of output which will be seen in the work curve. The situation in most cases can be dealt with in common-sense terms by opening and shutting windows or turning radiators off and on as desired. There are, however, certain processes which require high humidity, as in the textile trade, or which involve uncomfortable degrees of heat as in certain types of metal smelting or foundry work. These may require special treatment, and the measures involved may be elaborate and expensive.

One method which makes it possible to deal with practically any atmospheric discomfort is to isolate the building from the outside completely and to circulate the air within it by mechanical means. In this way air can be warmed or cooled, dried or humidified artificially and blown through the ducts which lead to various rooms in the building by means of fans, at a given rate of movement. If the pressure within the building is kept a little higher than that of the outside air then the "used" air within the building will escape on its own and will prevent any outer air from coming in through the orifice by which it leaves. This system, which has been described in the merest outline, is known as air-conditioning, and it can be used to keep rooms cool in warm weather or warm in cold weather as may be required.

FUMES AND DUST

There remains the question of unpleasant substances in the air itself. It was formerly thought that people breathed out "bad air" and that this caused rooms to be stuffy because of the reduced oxygen and increased carbon dioxide content. It is now known that, except in hermetically sealed compartments, ordinary breathing is very unlikely indeed to make enough difference in the oxygen and carbon dioxide content of the air to be at all significant. Discomfort is caused by loss of cooling-power and not by "bad air."

Some processes, however, give off fumes or dust which may remain in the air and cause discomfort or injury to the workers' health. When this occurs the only way of avoiding the unpleasant results is to draw away the impregnated air by an extraction system and to cleanse it by appropriate means of the noxious substances which it carries. The cleansing methods will vary according to the process and may be left to those who specialize in these matters. The extraction process is quite easy to understand, consisting as it does of a duct located at the working point so that it will catch all the particles or fumes given off by the process, and an extraction fan which sucks air down the duct and along it to the cleansing plant. The commonest examples may be seen in grinding or buffing wheels to carry off the dust from the process, or in fume cupboards in laboratories or where cellulosing or de-greasing is carried on. Should the process be dangerous, either through the amount or poisonous nature of the fumes given off, additional security can be given to the operators by the provision of a respirator. These, however, are not popular, and careful supervision is required to ensure that they are regularly worn.

GENERAL

We have considered the hours of work and seen how they can be arranged so as to minimize fatigue and boredom, and we have seen how various elements in the physical environment, such as noise, lighting, heating, and ventilation can, if they are of an unsatisfactory standard, lead to grumbling or to lowered rates of output. No attempt has been made to deal with these matters in detail, for the changes in apparatus and technique are so rapid nowadays that whenever a problem arises it is better to call in a lighting or heating engineer and to follow his advice. The ordinary manager need only have a general knowledge of the subject and the appropriate methods of measurement.

Occasionally, however, someone breaks into print on the beneficial effect of cleaning the windows or painting the walls of a factory. These, of course, are mere matters of good housekeeping and it is surely obvious enough that a dirty, littered workshop is less likely to conduce to good work than one which is reasonably fresh and tidy. Slovenliness in these matters is an attitude of mind which can usually be seen in other aspects of management routine.

Standards of housekeeping in factories are constantly rising, and in some of the newest and best the conditions are extremely pleasant. Beyond dealing with these elements in the working environment which, when they fall below a certain level, can have an adverse effect on health and output, it is no part of our task to deal in detail with this question.

SUMMARY

1. What is a work curve and how is it constructed?

A work curve is a graph showing fluctuations in the rate of output over a working period. It is constructed by laying out a time-scale on the horizontal axis and a speed of work along the vertical axis. In certain kinds of work it may be difficult to prepare a satisfactory estimate of speed, but in such cases some other measure, such as the incidence of errors, may be used.

2. How does physical fatigue show up in a work curve?

Fatigue shows itself in an increasing disinclination to continue with a heavy task, culminating in an irresistible desire to stop and rest. The characteristic work curve for fatiguing work shows a warming-up period, a short period of maximum output, and a fairly rapid decline.

3. What is the characteristic curve for a boring, monotonous task?

Boredom, which is distinct from physical fatigue, shows itself in an increasing difficulty in focusing attention on a repetitive task. The characteristic work curve shows a warming-up period, a reasonably long period of maximum output, lasting perhaps till more than half way through the working period, then a gradual decline sets in which will continue until within perhaps half an hour of the end of the period, at which point an "end-spurt" may be seen.

4. What light do work curves throw on the arrangement of hours of work?

In the first place they show that long hours yield diminishing returns in output because of the continuous falling off in the rate of production after a certain point. They also show that the introduction of a rest pause may, by lengthening the period of maximum rate of output, result in an increase in total production which more than offsets the time lost.

5. What is the effect of noise at work?

Continuous steady noise has little effect, even though it is quite loud, for after a period of habituation it may cease to be noticeable. Sharp, alarming noises which are intermittent, and human speech which is sufficiently distinct to be comprehensible, may have an adverse effect on operators by distracting attention, increasing nervous strain, and lowering rates of output.

6. What constitutes adequate lighting?

Standards are constantly rising, while the nature of the work calls for different degrees in intensity. Five to ten foot-candles overall, with at least ten at the working point, are probably adequate for all but the finest work. It is important that the quality of the light should be good, i.e. that there should be neither glare nor sharp shadows.

7. What constitutes adequate ventilation?

One's sense of comfort depends on the cooling-power of the air. If that is too low one will feel stuffy and uncomfortably hot, but if it is too high one will feel cold. Cooling-power is made up of three factors—

(*a*) temperature;
(*b*) humidity; and
(*c*) air movement.

A change in any one of these will, unless offset by the other two, affect the cooling-power of the air.

8. What causes air to be "bad" and how can this be dealt with?

Provided that the cooling-power is adequate, normal human breathing cannot make the air bad. Bad air is usually caused by fumes, dust, or other noxious elements that are introduced into it. These can be removed by extraction plants.

CHAPTER XVIII

ACCIDENTS

EVERYONE knows what an "accident" is, but when we come to define the term as it is used in industrial studies we may have to think for a little. "Meeting someone by accident" means that there was no previous knowledge or arrangement about the encounter, but this use of the word is obviously different from what is meant when we say that someone "met with an accident" at work. In this latter case the essential meaning of the word includes some form of injury, unintentional or unexpected injury perhaps, but still injury.

A further complication might arise through difficulty in deciding on how serious an injury must be before it is classified as an "accident." In most kinds of manual work people suffer scratches, cuts, and abrasions which are considered incidental to the job and too superficial to be worth mentioning. While in a small number of cases these may lead to serious infections, they are normally not sufficiently serious to be thought of as "accidents." Only where the injury is bad enough to keep an employee off work for one or more days is it likely to be dignified by that name.

In this sense of the word, therefore, an "accident" occurs when an individual in the course of his work comes unexpectedly and unintentionally into a situation where he suffers a sufficiently serious injury to keep him off work for a day or more. Such situations can be of many different kinds. In some, the individual may be quite passive and the external environment active, as when he is standing motionless in a building which collapses about his ears. In others the external environment may be passive and the individual active, as when he falls off a quay or a dock. In others again both the individual and the external environment may be active as when he moves his hand in such a way that it is caught up in the machine.

It is obvious that accidents may be expected to occur more frequently in some environments than in others, but the dangerous situation may not always be recognized merely by observation.

Once careful records have been compiled and studied, however, it becomes clear which kind of environment produces accidents more frequently than others and that under certain conditions accidents may be expected to occur. Such records can also show something about the people involved in accidents, whether their actions have played a significant part in causing them, and whether certain kinds of people tend to have more accidents than others.

ACCIDENT RECORDS

Any study of accidents therefore begins with records, and we may turn first to these. The taking of particulars about an accident as it occurs presents no more difficulties than the recording of any other event, but once we start analysing these records in an attempt to classify these accidents complexities will arise. Some classifications may be quite simple and straightforward, but others may be more difficult to deal with.

As an example of a simple classification let us consider the place of the accident. In a factory, for example, we may take a ground plan and insert a pin on the location of each accident. If we have enough cases it is likely that the pins will tend to appear in clusters, each cluster calling for examination to see whether there is anything in the environment which might tend to bring about such accidents. In many cases this will be obvious, as, for example, in a wood-working shop when we found a cluster of pins around the circular saw. In other cases it might be less obvious and we might require to study the nature of the accidents a little before we realized that at that particular corner people tended to collide with moving trucks coming in a direction from which they could not be seen.

We cannot go into the various kinds of dangerous environment here in detail. A catalogue of places where there is danger of falling, being injured by moving machinery, or being overcome by noxious fumes, would be tedious and rather uninformative, whereas the limitations of space make it impossible to deal fully with the data available on this point. The reader is referred to the literature on the subject, either in the Factory Inspectors' reports or in other publications, for an adequate survey of the kinds of place where accidents tend to occur.

Many of these places, can, of course, be made safe once it is known that accidents tend to occur there. The provision of handrails and guards for moving machinery, and similar precautions, will help to prevent accidents and a code of precautionary measures of this kind has been drawn up in the Factory Acts and is enforced by the Factory Inspectorate. These are continuously being improved and extended, and once again the reader is advised to consult the literature.

What is perhaps best worth emphasizing here is the method by which the subject has been approached. Common sense tells anyone that a band-saw is dangerous but only records make it clear how often and under what circumstances accidents actually occur. When we have this knowledge we can set about devising precautionary measures to avoid those which are most common.

PRECAUTIONARY MEASURES AND TRAINING

Making the environment safe, however, is not simply a matter of fitting appropriate guards and leaving it at that. In many cases these guards will involve a change in the working method and the natural dislike of change may tempt operators to leave them off, or in other ways render them ineffective. A great deal of ingenuity has been shown in the design of guards which are foolproof and without the proper use of which machines cannot be operated. For example, the controls of a press have been altered so that both hands must be placed on buttons well above the working point before it can be actuated. This means that it is mechanically impossible for the operator's hands to be near the position of danger when the press comes down. But even here a determined operator can rig up a piece of wood to depress one button while he works the other with his hand, thus bringing the press back to the dangerous one-handed method of operation which the new controls were designed to avoid. Without the intelligent co-operation of the operator, guards and safety devices may be of limited use.

This raises the question of training and, as in all other training schemes, a start must be made with motivation. Teaching a worker to use a method which seems more awkward than it need be will be an impossible task unless he can be brought to see some very good reason for it. Relying on a habitual set of movements learned blindly as a drill may be of limited value in the teaching of safe working methods. It is sounder to start by awakening a realization of the need for safe working methods, though this may conflict with the necessity for building up confidence in the early stages of training.

The matter is a delicate one and requires to be thought out carefully. Putting up gruesome posters showing mutilated bodies or wounded limbs may simply awaken an unreasoning fear that accidents are lurking round the corner and may catch one unawares. Such an attitude is unhelpful and unconstructive and will not result in adequate motivation to learn safe methods. Showing the dangers of an operation should always be linked up with information on how these dangers can be avoided, so that the individual is left with the impression that provided he understands the situation and goes the right way about it he will be quite safe.

In the United States during the war there was an interesting illustration of the irrational attitude to safe working methods. A well-known female star had appeared in a number of films with her hair hanging loose over her face in a style which was dignified by the name of a "Peek-a-boo bob." This style caught on and was adopted by numbers of young women workers in the war industries. The difficulty was, however, that such a loose coiffure tended to get caught when the workers bent over their machines, and a number who were on drilling machines or others with rapidly moving parts were well and truly scalped. Direct orders to wear caps were treated as infringements of their liberty, propaganda was ineffective, and quite a number of accidents ensued until the film star was persuaded to do her hair in a different style and declare the former one old-fashioned.

The Role of the Supervisor

The use of goggles to protect the eyes from chips and splinters, of respirators against fumes and of other types of protective clothing, raises the same kind of problem. No matter how carefully designed these may be they will in most cases involve a certain amount of minor awkwardness or discomfort when worn, and operators will be tempted to discard them or find excuses for not wearing them. Supervision will be necessary to ensure their continued use, and this will only be provided if the supervisor is aware of the dangers and is properly trained in the methods of avoiding them.

In some cases the regrettable tendency to short-circuit the supervisor has made its appearance here as elsewhere. Safety committees have been set up to encourage awareness of the problem among workers and safety officers appointed to supervise the working methods from this point of view. So long as these are properly related to the working of the firm as a whole they can do nothing but good, but if they tend to interfere too much at the working point they may dilute the supervisor's sense of responsibility on this matter.

THE ACCIDENT-PRONE WORKER

The individual worker can contribute also to accidents. Even though the hazards in the environment are virtually eliminated and effective steps taken to make people aware of such risks as remain there is still the possibility that workers may injure themselves through what is usually described as "carelessness." This word can cover a multitude of sins.

Bad selection, of course, will make itself felt here. If a worker is not up to standard physically he is likely to become fatigued and inaccurate in his movements. This will increase the risk of accidents, in the same way as lack of manual dexterity or inadequate co-ordination on work which calls for these qualities. Similarly badly selected workers who get bored with their jobs may become inattentive and liable to accidents, while there is a minority of people who develop an irrational fear of machinery, which has the same effect. These feelings may spring from a badly organized disposition or may be the result of putting someone on to a machine too complex for his level of understanding.

This connexion between selection and accidents has in the past led to an endeavour to detect "accident prone-ness" by means of tests. At times it appeared that a small number of workers were having more than their share of accidents. Tests of motor co-ordination and other qualities were applied and the workers with high accident records seemed to get significantly lower or higher scores than the remainder. It was argued, therefore, that such tests would be useful in showing beforehand which would be the safe workers and which would have accidents. These hopes, however, do not appear to have been borne out in practice, and it seems likely that if workers are properly selected and all their attributes taken into consideration, they should become, after training, safe as well as efficient.

SUMMARY

1. What constitutes an "accident" in industrial work?

Probably the best definition of an accident is a situation, met with unexpectedly and unintentionally by an individual in the course of his work, in which he suffers an injury sufficiently serious to keep him off work for a day or more.

2. How may accidents be caused?

An accident may occur when an individual who remains passive is injured by something in the environment. It may occur when the environment is passive and the individual does something which causes him an injury. Or it may happen when both individual and environment are active, and their interaction leads to an injury.

3. How can dangers in the environment be detected and dealt with?

Adequate recording of accidents will show the places where they tend to occur most frequently. Steps can then be taken to provide guards or other appropriate means to reduce the risks at these points.

4. What can be done about accidents which result from interaction between the operator and the environment?

Such accidents are usually due to faulty working methods and their avoidance depends on training operators to use methods which are safe. This raises all the problems normally associated with training, in particular those of motivation and insight.

5. What happens when the operator contributes mainly to the cause of accidents?

If an operator is unsuited to his job, either by intelligence, aptitude, disposition or any other of the points previously considered, he may by his inability to pick up safe working methods and adjust satisfactorily to his job, have more than his share of accidents. This, however, is a matter which adequate selection methods should take care of to a great extent.

PART III—SOCIAL PSYCHOLOGY

CHAPTER XIX

INTRODUCTORY

In the preceding section we have been considering the individual in the work-situation and we have seen the importance of fitting him into the type of job which makes best use of his capacities and aptitudes, and which gives him the kind of satisfactions he is seeking. We have also dealt with other items in his adjustment to the work-environment, physical conditions, methods of work, and so on. But while all these matters are significant in the study of human behaviour in this particular area of activity they leave out one very important influence—that of the other people with whom the individual comes into contact throughout the working day. It is to this question, which has only been touched upon incidentally up to the present, that we shall turn our attention in the following chapters.

Most of our lives are passed among other people and from our very earliest days we are influenced by them or in other ways we interact with them. Many of our standards and attitudes are instilled in us by the people we live among and a great deal of our emotional life depends for its expression on having other people about us. In fact, from the social psychologist's point of view it is difficult or impossible to detach the individual completely from the network of relationships he has built up with other people. To a very great extent these relationships make up the life of the individual in the community.

We have pointed out above how an individual's life is made up of several different spheres of activity—his home and family life, his leisure-time pursuits, his working life, and so on. Each of these spheres involves activity with other people so that we can conceive of an individual's life as involving membership of a number of overlapping groups—a family group, a leisure-time group, a working group, and so on.

To understand an individual's life, therefore, we must know something about the workings of social groups.

THE STRUCTURE OF SOCIAL GROUPS

A social group is linked together by a network of relationships. When people come together by accident but remain isolated from each other without exchanging words or conversation—as in the normal railway compartment—they remain a mere collection of individuals. But as soon as anyone makes a remark and another answers, a new element has entered into the situation: a relationship has come into being between the two speakers, and also to some extent between them and the others. If the conversation continues and becomes general the network of relationships will grow larger and more complex until everyone in the group is included in it.

These networks of relationships are worth a great deal of study. In the first place they involve the individuals in social roles. The person who opened the conversation, for example, and who proves continuously garrulous and assertive falls quickly into the role of "the talkative man," for his place in the relationships within the group is an active and important one. The others who fall under his influence and who are interested and impressed by what he says fall into the role of listeners or followers. The taciturn gentleman in the corner who takes little part in the conversation but whose remarks are invariably disparaging or critical falls into the role of "the awkward type," and may form a little knot of unpleasantness in the network of relationships.

This last role brings up another point about the workings of a social group. The relationships of which it is composed vary in quality. In our railway-compartment situation the general tone of the conversation may be affable and agreeable and the relationships may be predominantly good in quality. In such a case the individuals in the group will see each other in terms of these good relationships and think each other rather pleasant people. But suppose the conversation starts with an argument about whether the window should be shut or open in which harsh words are spoken and recriminations exchanged. In such a case the quality of the relationships will be poor and the members of the group, seeing each other in terms of these poor relationships, will think they have fallen among a rather unpleasant lot of people.

GROUP STANDARDS AND ATTITUDES

Within a group which has been established for a long time there will also be certain common attitudes. It may be considered correct to talk with a particular kind of accent and disparage anyone whose speech does not conform to it. Certain kinds of behaviour may be considered "bumptious" or "pansy" according to the standards of a particular group, while someone who works hard may be thought of as a "rate-buster" in one group, or someone who does not work hard enough may be considered a "slacker" in another. Finding out the prevailing attitudes in a group is always an important and interesting study.

The structure of relationships on which a group depends for its existence varies from one to another. In certain groups one member is recognized as the leader. He decides what is to be done and the others carry out his directions. In other groups the leadership may shift according to what is being done, one member coming to the front when quick action is required, another when a more complex situation has to be handled. In other groups again there seems to be little or no formal leadership and everyone seems to work to a common plan with a minimum of direction. Each of these types of structure is best adapted to a particular kind of task, and different kinds of work will be done most efficiently by the group whose structure is best suited to it.

METHODS OF STUDYING SOCIAL GROUPS

These are some of the points which the social psychologist must take into consideration when considering a social group. His methods of approaching them are necessarily less precise than, say, in the study of perception, but nevertheless there are means of describing and classifying the structure of groups, the prevailing attitudes within them and the quality of the relationships between members. Many of these depend on encouraging people to express an opinion, either by means of a questionnaire or in a prepared interview situation. In other cases people may be encouraged to talk at random in an unguided interview while the investigator notes the points to which they seem to return in the conversation and about which they seem to have strong views or emotions. In other cases again a kind of voting procedure can be adopted which shows how each member of the group regards the others and from which diagrams can be constructed which give a very clear account of the structure of relationships within the group.

In considering an industrial organization from the social psychologist's point of view the first thing one must find out is what might be called its *social anatomy*. Every organization is built up of a number of interlocking groups from the half-dozen senior managers who report direct to the managing director down through department managers and supervisor groups to the actual workers on the factory floor. There is, or should be, an official scheme of organization but the actual groupings within the company do not always conform exactly to it. It is important to know how the individuals who make up the organization are actually grouped together in their day-to-day working. This subject is dealt with in Chapter XX.

Once the social anatomy is understood, two things must next be considered. First there is the *relationship between these groups*—how each regards the other and how easily communication can take place between them, remembering that the main function of many management groups is communication of information and instructions from the point where they originate to the place where action is to be taken on them.

Next comes the question of the *relationships within these groups*—whether they are of good quality and whether their structure is well suited to the particular task which the group has to undertake. From this we move naturally to the question of *leadership* and we must consider its nature both in the primary working group and in the larger organization. Chapter XXI is devoted to this subject.

Most important of all in industry is the *primary working group* of a dozen or so workers who are daily in face-to-face relationships with each other under one leader. In the long run every organization, no matter how large it may be, boils down to a number of these primary working groups and the standards of efficiency and the quality of relationships which prevail within them will determine the efficiency and morale in the organization as a whole (see Chapter XXII).

The absorption of new members into an established working group does not always happen naturally and spontaneously. Frequently there is an *initiation period* in which the new member acquires a knowledge of the standards and customs of the group. This period is of supreme importance in determining the attitudes which the new member develops towards the organization and the role he accepts among his immediate workmates. In the *rehabilitation* of injured or handicapped workers this period is of special importance, for in many cases the actual physical injury they have suffered is less serious in the long run than the feeling of being cut off from the group of which they have so long formed a part. This is dealt with in Chapter XXIII.

Much of our knowledge of these matters in industry comes from a series of investigations (the Hawthorne Investigations) in one of the Western Electric Company's works near Chicago (see Chapter XXIV). These began as a study of the physical conditions of work but they came more and more to throw the intangible factor of *morale* into prominence. It soon became apparent that this factor by itself could override other conditions of work and the studies continued until by elucidating certain questions about the relationships and attitudes within groups they brought to light something of the psychological basis of morale. The subject is considered in the concluding chapter (Chapter XXV).

SUMMARY

1. What is the subject-matter of social psychology?

Each individual's life is made up of different spheres of activity, in each of which he is usually in contact with other individuals. These work or leisure-time groups will be held together by a series of relationships which in turn will involve the members in social roles. We all of us depend for a great part of our emotional life on these groupings, and the study of what goes on in them is the subject-matter of social psychology.

2. Are there any significant differences between one social group and another?

Every social group has a life of its own which is quite distinct and characteristic. The relationships which hold it together may vary in structure and quality, and the commonly accepted standards and attitudes may vary so widely that what is acceptable behaviour in one group is considered quite intolerable in another. The purpose for which the group has come into existence will also have an effect upon it.

3. What are the methods of the social psychologist?

Probably the main preoccupation of the social psychologist is with attitudes, and the means of studying these are necessarily less precise than the methods of other sciences. Interviews, questionnaires, and various voting or ranking procedures are utilized from time to time as a means of observing what takes place when people are in contact with each other.

CHAPTER XX

THE SOCIAL ANATOMY OF AN INDUSTRIAL COMPANY

ALL social life must take place within some framework of organization, otherwise men must revert to the law of the jungle. Before we can understand the individual's attitudes and relationships we must have an idea of this background.

Industrial companies vary in their structure according to the purpose for which they are set up. In general, however, they will fall into some kind of hierarchical organization, in which one man will be found in general charge, either of the company as a whole or of one of its sub-units. This general manager, managing director or whatever his title may be, will be responsible for the overall direction of the business either according to a policy laid down by a board of directors or according to his own ideas, if he happens also be to the owner of the business.

Beneath this chief executive the company will probably split into a number of vertical divisions each concerned with one of the principal aspects of its functioning. Once again an individual will be in general charge; the sales manager, for example, who is responsible for keeping in touch with markets and ensuring that the products are sold profitably; the production manager, whose job is to make them; or the development manager, whose job is to think ahead and consider new products, and new methods and processes.

Within each of these divisions the same picture will be repeated. The manager will have his immediate subordinates, each concerned perhaps with a department within the division or with one fairly separate aspect of its work. On the production side of the firm, for example, the production manager will be in general charge, while his immediate subordinates will be, say, six department managers. Each of these will have a number of foremen under his control, while each of these will have a number of charge-hands under him. Under the charge-hands will be found the actual production workers.

The conventional manner of representing this organizational framework is by a diagram such as is shown in Fig. 46.

This shows up the hierarchical nature of the organization as it broadens down in a pyramid from the general manager at the top to the production workers at the bottom, and it is obviously in some such manner that human beings are usually organized when they work together. By this means it is possible to know who is responsible for what, and whom a person is responsible to. It provides also a means of control and co-ordination.

It is not certain, however, that such a diagram gives the clearest and most realistic picture of the workings of an industrial company. It does, for example, rather tend to concentrate attention on higher management and thence with diminishing emphasis on middle management and supervision until at the very last a few production workers appear, to fill up the picture as it were. But we must always remember that it is the production operatives who actually do the work, controlling the machines, using the tools, and making or transporting the finished product. In the last resort the management and supervisory staff only exist to facilitate and co-ordinate the efforts of the production workers. It might in effect be more convincing if we were to re-draw the diagram on the lines of Fig. 47.

Such a diagram might give the impression of the production workers being in the front line, with supervisors and management behind ensuring that everything they might need in the course of their work was easily available.

It is essential that this formal organization of management should be coherent and complete, for if this is not so there will be the danger that one individual or group may receive orders from more than one person. There is also the danger that individuals may be left out and may have an undefined power over others.

COMMUNICATIONS FROM THE TOP DOWNWARDS

It is through this hierarchy of management that the communications pass on which the working of a company depends. Instructions must pass downwards from those who are responsible for the direction and management of the business. Their task is to understand the possibilities of the production and

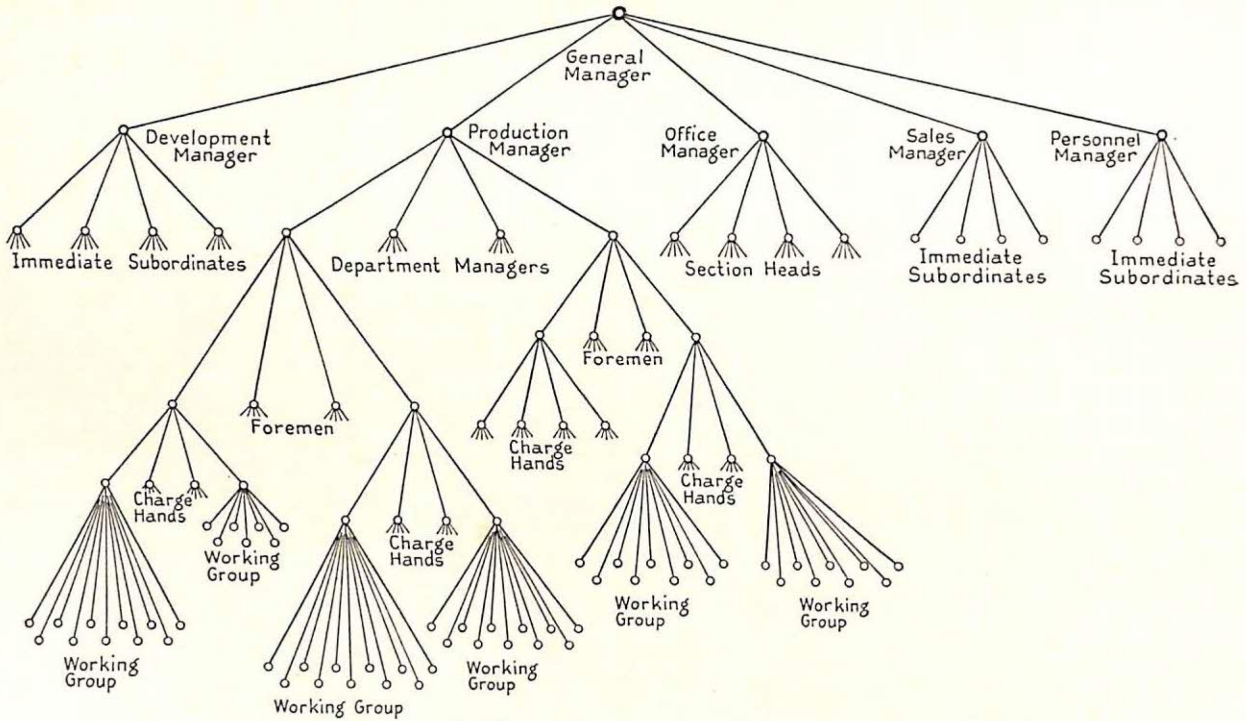


FIG. 46. ORGANIZATION OF AN INDUSTRIAL COMPANY

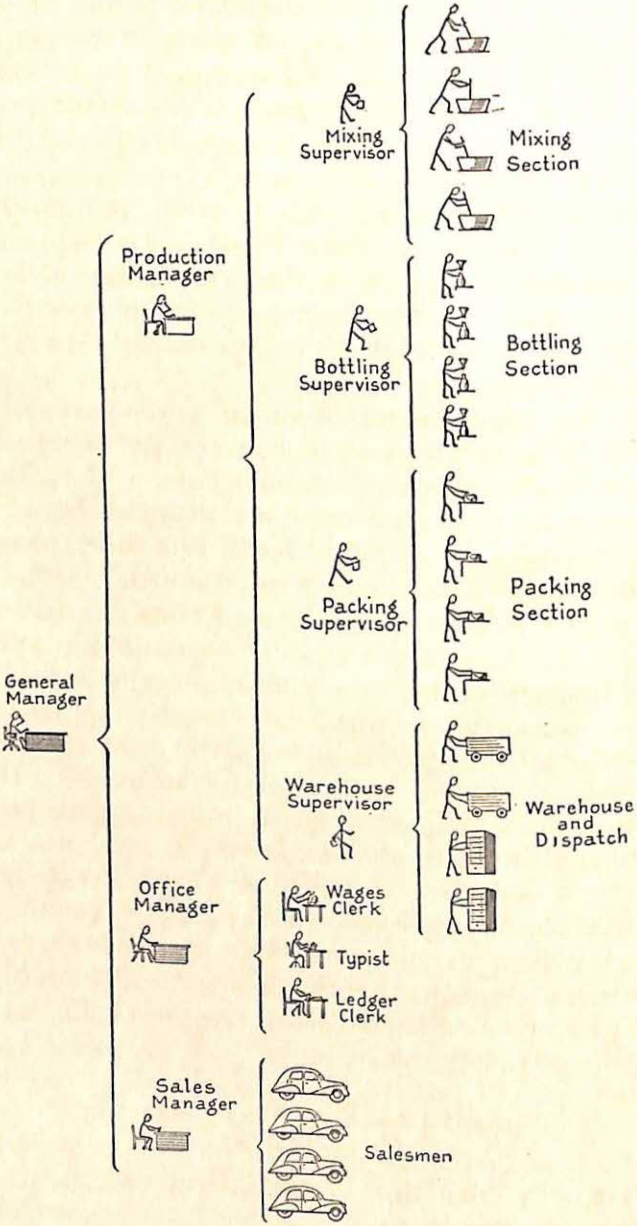


FIG. 47. IMPRESSIONISTIC STUDY OF A COMPANY'S STRUCTURE

marketing situation and to take whatever steps may be necessary to safeguard and develop the company in the immediate future. But no matter how well conceived these instructions may be and no matter how practicable and sensible, they will remain a dead letter until they are put into effect at the actual working point. Higher management, however, cannot follow each instruction down the line in detail and supervise its carrying out on the factory floor; this is the task of other people in the hierarchy. And unless the other people comprehend and pass on these instructions accurately and effectively they may arrive at the working point in a seriously distorted and impracticable form.

There are many opportunities for misunderstanding and distortion between the general manager and the production floor, for every individual through whom the instruction must pass can either omit some essential element or give it an unfavourable turn or twist. But it is of little use trying to short-circuit the normal chain of command because each section and level must translate instructions into terms which take account of their own duties and responsibilities and which can be understood by those below. Senior management, except on rare occasions which are carefully prepared beforehand, cannot communicate direct with production workers in the normal working of a company's business. If it has occasion to do so frequently this is probably a symptom that the normal channels of communication have been allowed to deteriorate to such an extent that they have become slow and unreliable. The remedy is not to hold more mass meetings but to improve the chain of command from the top downwards. Whatever starts from senior management as a practicable and obviously necessary development should reach every level affected by it in a form equally practicable, necessary, and appropriate to it.

COMMUNICATION UPWARDS

But not all the communications will take place from the top downwards. A great deal of the information on which the working of the firm depends will come from below upwards—from the point, in fact, where the actual production work is done. And if the difficulties and maladjustments which inevitably occur in the course of normal working are not brought to the notice of those who are responsible for putting them right, they may drag on and on until what was quite a minor difficulty in the first place has become a major problem around which a dangerous amount of emotion and dissatisfaction has gathered.

There are inevitable difficulties in ensuring that information about things going wrong passes upwards as quickly as it should do. No one likes to be thought inefficient, and when anything goes wrong in a section or department the manager or supervisor may well be tempted to try to sort it out on his own and keep the knowledge of it to himself even though the situation may be beyond him. Added to this there is a dislike of troubling superiors with details they may think unimportant or unworthy of their attention, while the memory of having been dealt with sharply on a former occasion may prevent someone from coming up with a real difficulty the next time. Even with the best will in the world, the forces of inertia and procrastination will ensure that a complaint or request coming from a worker will be dealt with less expeditiously than one which comes from higher authority.

The danger is that the results of faulty communications from below upwards may remain unnoticed for a long time while the situation deteriorates until a serious crisis occurs. Dissatisfaction over some minor matter which could be settled in a few minutes may drag on for months while an accession of exasperation grows up around this small case. When the irritation has reached a point at which it is brought to the notice of higher management it is no longer a minor practical difficulty which must be dealt with. It is rather a problem of tackling six months' bad feeling and a number of people who have worked themselves up to the pitch of making a mass complaint and who may feel a sense of anti-climax when their crusading spirit shows signs of fizzling out with the replacement of a broken window or whatever was the original cause of dissatisfaction.

In addition to straightforward communication upwards and downwards, of course, there must be some provision for lateral communication as well. When a machine goes wrong it would never do for the news to travel from worker to chargehand, then through the foreman and department manager before it passed across to the maintenance department by means of direct contact between the production manager and the chief engineer. From the latter it would have to pass down through foreman and charge-hand before a mechanic could be put on to do a minor repair. In some organizations it may sometimes seem as though this is the only method of getting things done, but in practice it should be possible to communicate from one department to another at, say, the foreman or department manager level.

THE NERVOUS SYSTEM OF THE COMPANY

This network of communications through the management and supervisory grades forms the nervous system of a company. In the human body the nervous system conveys information and instructions in much the same way. When we sit on a tack, the pain caused by the sharp point piercing our epidermis is conveyed by means of nerve fibres to the lower part of our brain. There a message is sent out on other nerve fibres to the appropriate muscles and action is initiated which will raise us off the offending point. Provided that our central nervous system is in working order these messages will pass rapidly and the process of feeling the pain and jumping up again will all happen in a flash. Where the nervous system is faulty, as happens in the case of certain diseases, the messages may pass slowly or not at all, and people with these diseases can suffer very bad burns indeed because the pain of touching a hot object is passed too slowly to their brain for them to take their hand away in time.

As an example of how this communications network or nervous system functions in the normal working of a company's business, let us think of a textile firm, one of whose salesmen gets an idea during a visit to, say, South America, for a line of merchandise which would sell in that market. He works out a rough draft of the design and colouring, notes the price range within which it should fall, and decides that it should be on the market there by the 1st of September. Now this idea will only become effective when the workers on the machines are actually making these goods in the right style and quality. Let us see, therefore, how many steps must be gone through before this can happen.

1. The salesman must pass his idea with the information on which it is based to the sales manager. He, with his wider knowledge of the company's markets and arrangements for distribution may make some modifications before he accepts the proposal as fully practicable. Assuming that he does so the next step will be—

2. The sales manager will discuss it with the general manager, who considers it in the light of the company's overall programme for the next few months. If he agrees—

3. The development manager will be called in and asked to produce designs and perhaps a prototype of the goods required.

4. The office manager may at the same time be asked to study the arrangements for selling to South America, along with any currency complications that may arise.

5. Within the development manager's department there will be further communications with the chief designer and others concerned, with the result that a design is produced which answers the requirements originally put forward. The next step will be—

6. The production manager comes into the picture and is asked to prepare for the output of the goods so designed. He may put forward some modifications to meet his own particular problems after which—

7. The department managers concerned with the different stages of production will be told of the arrangements which concern them. They in turn will pass these on to—

8. The foreman and charge-hands under whose immediate control the actual work is done.

9. The final stage in all this passing of information and instructions, which must be gone through before a single article is produced, will be for the charge-hands to tell the operatives what to do and how to do it. Now it will be possible for production to begin in its various stages and for the goods wanted in South America to start being made in this country.

Such a description is perhaps not entirely realistic, because it omits certain complications on the one hand and assumes an unnaturally tidy differentiation of function on the other.

Nevertheless it does represent something of the complexity of the communications involved in the working of a modern company and it does illustrate the number of different people through whom the matter must pass before appropriate action can be initiated. It is important to remember that at each of the links in the communications network there is an opportunity for a stupid, idle or uncooperative person to slow down or ruin the whole process.

A PATTERN OF OVERLAPPING GROUPS

But when we look again at an industrial company and disregard its communications network or nervous system, we shall see that the people who make it up fall into a number of groups. Many of these groups are formed by the normal work of production, as when six or a dozen men are engaged on the drilling, shovelling, and so on incidental to digging a hole in the road. In fact when we walk through a factory we shall find that most productive work is done in fairly small groups of this kind. These little units in which people work in direct, face-to-face contact with each other can be thought of as the primary working groups, and they are the social cells of any organization. Because they are the smallest units of association among people they are of very great importance in the working of a company. In some cases they are recognized and provided for in the organization of the firm, but in other cases they are not. This point will be discussed further in Chapter XXII.

Other groups, however, may not consist of people who are working in day-to-day contact with each other. The half-dozen charge-hands, for example, who are under the control of a foreman may all be working in different parts of the shop and may only see each other when the exigencies of the work make it necessary for one to walk over and talk to another. They may only meet all together in one place at the same time very occasionally when, for example, the foreman calls them together to discuss some question which affects them all. They are, nevertheless, a group, for the organization depends on their working together. Such groups of people who are not in face-to-face contact with each other in the normal working of the firm can be thought of as secondary groups.

Practically all the management and supervisory grades of a firm will fall into groups like those shown in Fig. 48.

In fact, when we look at the accompanying diagram we shall see that an industrial company consists from this point of view of an aggregation of social groups. Beginning at the centre, we have the general manager with his immediate subordinates. Together they form the nerve-centre of the management network, meeting perhaps in a weekly conference, co-ordinating and directing the activities of the business. Next outwards from this central group we have the general manager's immediate subordinates, now in the role of leaders, each the central figure in his own group of subordinates. The production manager has his foremen grouped around him, the office manager his section heads, the sales manager his salesmen and so on. According to the size of each department we shall go through more stages outwards from the centre, each subordinate having his dual role, being also leader among his own group of subordinates. Eventually we shall reach the periphery where we come to those who have no subordinates to direct, but who are left with no alternative but to get on with the job themselves.

The kind of frog-spawn picture in the accompanying diagram shows the more obvious groups into which an organization may fall. There may be others superimposed on this, such as inter-departmental committees set up to deal with specific questions, or relations between different departments, such as maintenance and production, at the lower levels. Moreover the diagram may not represent any one company exactly, as it is drawn primarily as an illustration. Nevertheless if the reader thinks of any company with which he is intimately acquainted he will find that from this point of view it will break down into a somewhat similar pattern of interlocking groups.

Relationships within these Groups

Now, as is well known, the quality of the relationships or the team-spirit within different groups can vary widely. In some there may be pleasant relationships and a general atmosphere of friendliness and co-operation, things can be discussed constructively and it is not difficult to arrive at

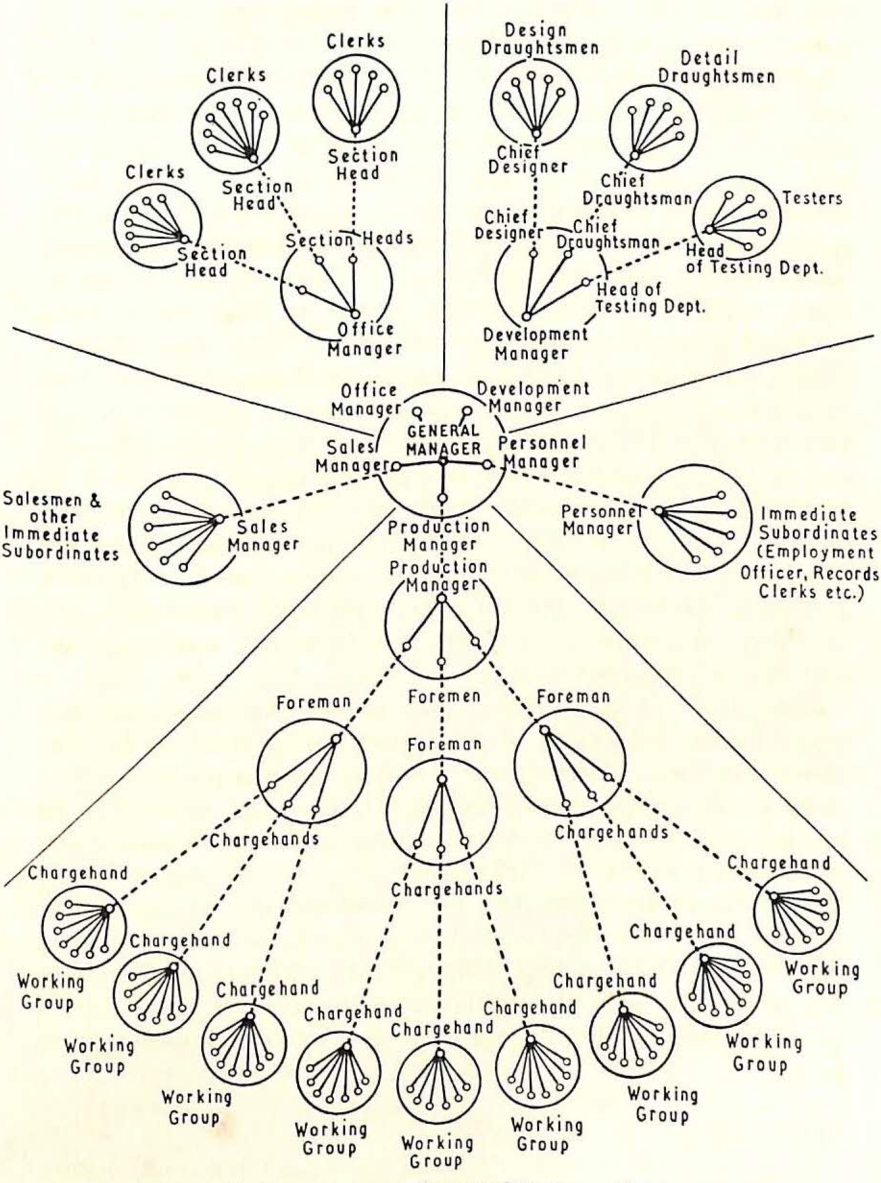


Fig. 48. Interlocking Groups Within a Company

decisions on the merits of each case as it arises. Groups like these are usually effective working units as well as being very agreeable to work in. In others, however, there may be a spirit of distrust and suspicion, the relationships may be very bad, and only after prolonged argument and the unsparing use of authority can any decision be reached at all. Groups like these will usually be ineffective working units, because quite apart from the time they waste, the decisions they reach may often be the result of contending internal stresses rather than an objective consideration of the position.

Social groups are made up of human beings, who between them determine the quality of relationships or the social atmosphere. Some people who are very badly adjusted themselves will find it difficult or impossible to contribute to good team-spirit among others and will always tend to lower the quality of relationships of the people among whom they work. Other people, who may be outstandingly well adjusted, may have an opposite effect and may tend always to improve the team-spirit of the groups in which they find themselves. The majority will probably fall between these two extremes, sometimes joining in the maintenance of happy relationships and sometimes spoiling things by tactlessness or clumsiness, their contribution depending rather on the effort they make, on what they want from the situation, and to a certain extent on luck.

It will not have escaped the reader's notice that all the supervisory and managerial staff find themselves members of more than one group. They occupy one position in the group of subordinates of whom they are in charge and quite another in the group in which they themselves are subordinates. In both these situations different roles will be demanded of them, and they may find one or the other coming more naturally to them. Over and above the formal organization shown in the diagram they may find themselves members of other groups which demand different roles still.

THE STRUCTURE OF COMPANIES

Let it be emphasized strongly that this pattern of interlocking groups is not something artificial which is theoretically imposed on a company by an outside observer. These are the actual groupings into which men and women fall in the normal course of their day-to-day work. The diagrams and examples given may not fit any existing company exactly and in detail, but that does not matter. Every company will fall into some kind of structure on something like these lines and will show a similar picture of interlocking groups. No collection of men and women who remain together for more than a few hours can remain "unstructured." Particularly if they work together they must develop some form of organization, and from our point of view that organization will comprise both a network of communications and a system of interlocking groups.

It is these groups that are interesting from the point of view of social psychology, because in them the standards of relationship and of working efficiency will be determined. Team-spirit within an industrial company is not a question of what the workers think of the managing director. It is rather a matter of what the different standards of relationship within the multifarious groups within the organization add up to, and if a significant number have very bad relationships, then the overall picture will inevitably be a discouraging one. In the same way the efficiency of a company is not simply a matter of how well the higher executives know their individual jobs. It is rather a matter of the working methods within these various groups and the communications between them, and if even a small proportion of these are bad the company will only be saved from serious difficulties by superhuman efforts on the part of the remainder.

When we are considering an industrial company, therefore, we must begin by looking beyond the hundreds or thousands of people whom it employs, because numbers of this size are rather meaningless when considered in the mass. We must begin by trying to understand the social structure of the organization, the network of communications within it, and the social groups into which people fall while at work. Only in this way can we begin to understand what is going on.

SUMMARY

1. Is there anything in common between the organizational plan of different companies?

In general, industrial companies and any other organizations which exist to carry out a definite purpose, fall into a hierarchy.

At the top will be found those who are concerned with the general direction of the company and immediately below, those who are responsible for one particular aspect of its working. These in turn will have a group of immediate subordinates each of whom will have others under his charge, until we reach the people who do the actual work of the organization—making, transporting, or distributing the goods with which it is concerned.

2. How do the communications, on which the company's working depends, pass through this hierarchy?

Communications must pass from the top downwards, as most of the instructions on which the direction of the company depends originate in the top groups of management. But many of the difficulties which are encountered in its day-to-day working will make themselves felt at the actual working point. Unless information about what actually happens at that point is passed quickly upwards these difficulties may not be dealt with. It will also be necessary for lateral communication to take place between departments.

3. How important are good communications in an industrial company?

The communications network may be looked on as the company's nervous system, and unless that nervous system works quickly and efficiently, the company's adjustment to the changing demands and pressures on it will be slow and ineffective. Ideally, any difficulty or friction at any point in the organization should be heard of at once by the person responsible for doing something about it. In practice, however, communications have to pass through so many individuals that there is always room for misunderstanding and delay.

4. Is there any other way of looking at a company's organization?

Any organization will fall into a series of groups, beginning with the primary working group where people are in face-to-face contact with each other day by day. Above these will come secondary groups of supervisors or managers reporting to one individual in charge. At the top will be found the senior management group which is responsible for running the business.

5. Are the relationships within these groups always of the same quality?

The relationships within different groups can vary widely in quality. In some there is a good team-spirit and people work co-operatively together. In others there will be poor relationships and it will be difficult to get anything done without arguments and bad temper. These difficulties will be due in part to the different levels of adjustment of the individuals who form these groups.

6. How should we think of an industrial company, then, from the social psychologist's point of view?

An industrial company may be thought of as a collection of individuals assembled for an economic purpose and held together by a structure of organization. This organizational structure can be thought of first of all as a communications network, and secondly as a means of subdividing the company into manageable groups. All the management and supervisory staff will find themselves members of at least two of these groups.

CHAPTER XXI

LEADERSHIP

If, as we have seen, an industrial company falls into a series of interlocking groups, then an understanding of it as a social unit depends to a great extent on understanding what is going on within its component groups. We must, therefore, look rather more closely at these groups and try to find out what holds them together and why one may be a happier and more effective working unit than another. This will bring us to the question of leadership, for in the long run leadership is a matter of influencing one or more groups of people.

First, then, let us consider what holds a group of people together, what makes the difference between twenty strangers who happen to find themselves in the same place at the same time, and twenty people who know each other and are capable of working effectively together. Clearly, in the second case there is some kind of bond between the individuals which is lacking in the first, but it is rather difficult to describe exactly what this bond consists of. It is easy enough, however, to know whether it exists or not. Think of two people alone in a railway compartment, each isolated from the other and immersed in his own concerns, each reading his newspaper with no conversation taking place between them. In such a situation we have two animate bodies and nothing more; there is no bond between them.

Let us imagine, however, that a conversation begins between the two, perhaps over an exchange of newspapers or magazines. At once the situation has changed, for besides the two individuals in the compartment a new element has appeared which will strengthen and develop as the conversation proceeds. This will be a bond or relationship—call it what you will—between the two, and as the two continue to talk it will become more real and significant as attitudes towards the other person grow up, as expectations are formed of what he will say and do, and as we gain a stronger impression of him as a person. It is this new element, this bond or relationship, which holds people together and makes the difference between a crowd of strangers and a formed group.

RELATIONSHIPS BETWEEN INDIVIDUALS

Now there are many things to note about the relationships between people, the first of which is the question of their quality. In some cases this will be pleasant and agreeable, as when our two strangers in the railway compartment begin their conversation with amicable exchange of newspapers, pass on to a discussion of the weather and the view, and then proceed to a friendly criticism of the organization and personnel of the railway company. Each will tend to think of the other as quite a pleasant sort of chap, seeing him in terms of this good quality relationship which has grown up between them. But if, by chance, the two strangers had begun their conversation with an acrimonious argument about whether the window should be open or shut, in the course of which one had told the other that he didn't propose to catch his death of cold sitting in a draught because an uncivilized fresh-air-fiend had got into a train in which one had a right to expect that decent people would be travelling, then the relationship between them would be neither pleasant nor reassuring. And after such an exchange each would tend to think of the other as an ill-conditioned fellow, seeing him once more in terms of the poor quality relationship between them. In this way the quality of the relationship will affect the attitude of the two people to each other.

Certain relationships also will contain within them expectations that one person will behave in a certain way towards the other. This may be illustrated when we enter an expensive restaurant to order a meal. In these circumstances we expect that the waiter will be considerate and helpful, possibly even a little deferential, as he takes our order and brings in our meal. It would come as a distinct shock if he greeted us with the words "Wotcher cock! Come in for yer bit o' dinner again eh?" and we would consider him insolent and familiar for thus failing to act up to our expectations. Many relationships to a great extent depend on the assumption that one person will give the directions and the other will carry them out. In some cases it may be quite explicit and formalized while in others it may never be put into words or formally recognized.

These relationships between people, therefore, which hold groups together and on which organized social life depends, can be extremely intricate and subtle. They are very difficult to describe and analyse, because they vary in quality and because they depend on a variety of expressed or tacit assumptions about the other person's behaviour or reactions. They are not, however, difficult to recognize, as anyone can prove to himself when he compares his feelings when he passes a stranger in the street with those when he sees a friend or acquaintance.

Patterns of Relationships

Among a group of people these relationships usually fall into some kind of pattern. In a simple case, for example, when one person is giving a lecture to a group of others, the relationships could be represented by a series of lines starting from the numbers and converging on the speaker thus—

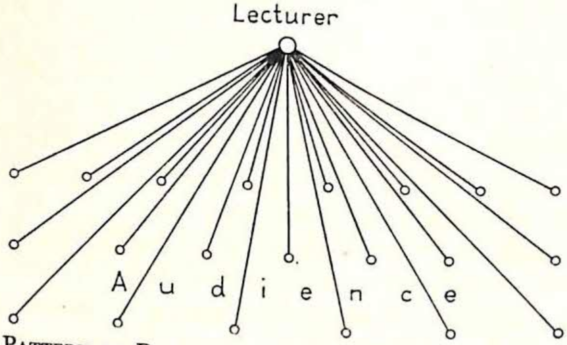


FIG. 49. PATTERN OF RELATIONSHIPS BETWEEN LECTURER AND AUDIENCE

A slightly more complex situation might be a play taking place in front of an audience. Among the players there might be a series of relationships built up by the circumstances of the plot, while in addition there would be relationships between the members of the audience and the actors as their attention centred now on one and now on another (see Fig. 50). These patterns will change according to the development of the situation, sometimes quickly, but sometimes leaving fairly stable and enduring traces behind.

Different patterns of relationships will develop according to what kind of task the group happens to be engaged in. The pattern shown in the first figure will obviously be the most suitable for a lecture; in fact it is difficult to think of a lecture being given without some such pattern of relationships being built up. The same pattern, however, would not be suitable for a working group, because if everyone sat around all day listening to the foreman holding forth, very little work would be done. A different pattern would be called for where the workers' attention was centred on their immediate tasks and where the appearance of the foreman did not cause a diversion of attention from the work to himself.

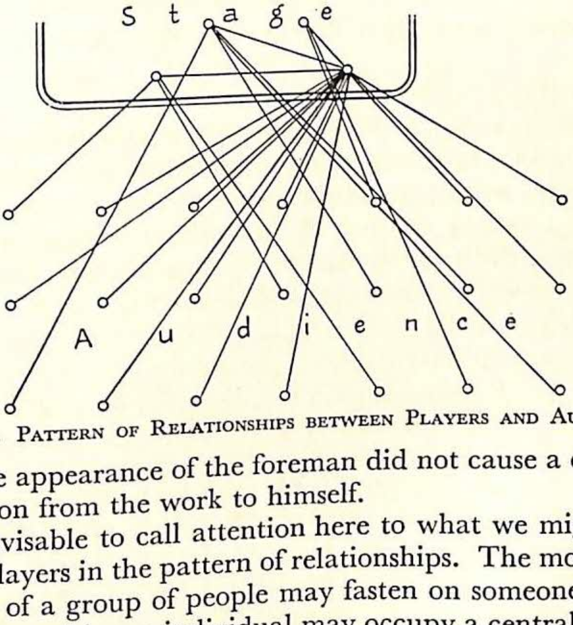


FIG. 50. PATTERN OF RELATIONSHIPS BETWEEN PLAYERS AND AUDIENCE

It is advisable to call attention here to what we might term different layers in the pattern of relationships. The momentary attention of a group of people may fasten on someone and for a small space this one individual may occupy a central position in this superficial pattern of relationships. Underlying this, however, there may be a deeper pattern of more significant relationships which may continue in existence for a longer period. The situation might be illustrated at a works concert where one of the labourers who can sing a song and is a bit of a comedian entertains the audience and perhaps even leads them in singing popular songs. For a brief moment he is at the centre of the relationships in the group, and is quite an important figure, but as soon as the concert ends and he slips back into place no one would dream of taking orders from him. The underlying pattern in which the key points are occupied by the management and supervisory staff will be reasserted and people will expect and accept direction from them in everything that concerns the company's working.

Social Roles

The next thing we have to notice about this pattern of relationships which binds a group together is that it involves the members in social roles. In a lecture situation, for example, the pattern will only be maintained if one person talks for a given period, expounding a theme which the others have assembled to listen to with sufficient clarity and novelty to make it reasonably interesting. The others must maintain silence while the lecturer talks and must at least keep up the appearance of listening with attention. In other words the lecturer must undertake a certain role in the situation and the audience another. Moreover, unless all the members of the group carry out their roles with a certain measure of success the group situation will break down. No lecture has ever been really successful where the lecturer went out for a drink half-way through, or where the audience stopped listening and began singing popular songs.

The same will hold good of any group situation. At work, for example, the role of the operatives is to carry out certain tasks, while that of the supervisor is to tell them what to do and see that they do it properly. If one of the operatives objects to being told what to do and fails to carry out his task—i.e. if he refuses the role which the situation requires of him—it will be difficult for him to remain in the group. Similarly if the supervisor is idle about setting tasks and organizing the daily details of the job—i.e. refuses his role—the group will be ineffective and probably rather poorly disciplined.

It is possible to illustrate how group situations depend on individuals filling the roles which the pattern of relationships demand of them in all sorts of ways. When small boys play cricket, for example, there is usually a good deal of argument about whether the batsman is "out" or not, not infrequently terminated by the owner of the bat deciding that he will go home and not play any more. At such an age boys find it difficult to stand up to the roles that a team game demands, particularly when no older person is present to ensure that they abide by the rules. The difference between a game in the park and a game at Lord's is in part a question of the levels of self-control which the players display in assuming the roles that the game demands. Similarly a good party is one where everyone is able to join in the fun and be gay and amusing—i.e. where they take suitable roles successfully. A dull party is one where not enough people can be bright and entertaining or where too many "won't play" or join in the fun, i.e. where they cannot sustain suitable roles.

There are also cases where attempts are made to break up the pattern of relationships on which a group depends by people refusing to take suitable roles and insisting on taking unsuitable ones. For example, when a party of hecklers goes to attend a political meeting held by the other party they have no intention of taking the role of listeners, which involves sitting quietly during the meeting and applauding at the end, which the situation demands of them. They intend rather to interrupt the speakers, to ask awkward questions and to "boo" instead of applauding, in fact to undertake the most unsuitable role they can think of. If they are successful in this they may make it impossible for the speakers to be heard, and if they are not thrown out they may cause the meeting to break up in disorder. That is to say they will have disrupted the pattern of relationships, on which the group situation depends for its existence, by refusing the roles which that situation demands of them and by taking up unsuitable ones.

This draws attention to the interdependence of social roles, which is a point of some importance in the understanding of relationships between people. When two people interact, the relationship between them arises out of the roles they adopt towards each other, or, to put it the other way round, the roles are simply the two ends of the relationship and cannot be separated from it. The manner in which one of the two parties plays his role, or indeed his willingness to accept that role, will affect the role of the person at the other end of the relationship. This may be illustrated by referring again to the political meeting. One person comes to the hall with the intention of taking a particular role in the pattern of relationships—the central role, that of speaker. But he will only be able to do so if the others present are willing to accept the reciprocal roles—those of listeners. If they are willing to sit quietly in the body of the hall and behave as an attentive audience, they make the speaker's role possible for him. But if one or more individuals has come with the intention of refusing this role of listener, the speaker's role can be made impossible for him. By interrupting, by heckling, by shouting rude remarks or by otherwise behaving in a manner which prevents the speaker from maintaining the even flow of his discourse, they can bring the meeting to a standstill.

This is where the competence of those who have arranged the meeting will be put to the test, for unless they can somehow maintain the pattern of roles and relationships on which it depends, the whole project will collapse. There are various courses open. Stewards can collar the interrupter and throw him out on his ear, saying "If you refuse to accept the role on which this structure of relationships depends, we cannot allow you to remain in the hall," or something else appropriate to the situation. Other members of the audience who find their roles satisfying may tell him to shut up. But the speaker, in the central role, can do more than anyone else to restore the situation. If he is experienced as a political figure, he may be able to maintain his role as a speaker by forcing the interrupter out of the disruptive role by means of which he is trying to sabotage the meeting. The ability to raise a laugh at the expense of a heckler, to score off him in a quick interchange, to confuse him and make him look ridiculous so that he subsides and keeps quiet from then on—these are essential weapons in the armoury of a political speaker if he is to deal successfully with those who attempt to "put him off his stroke" or to make his role impossible by refusing to accept the role which is its counterpart and on which it depends.

There is, therefore, a skill in handling our relations with other people, one part of which is to be able to recognize the role expected of oneself and to play it successfully. But another and perhaps more important element is the ability to draw other people into the roles which are reciprocal to that which one wishes to play and on which it depends. Thus, no one can be a speaker unless he can persuade other people to accept the role of audience; there can be no leader unless he can find others who will accept the role of followers, no order-giver without an order-taker, no bully without someone to cringe before him, no martyr without a persecutor, and so on.

Recapitulating what has been said about group situations, therefore, we have found that—

1. They depend on bonds between the members.
2. These bonds can be pleasant or unpleasant in quality and can involve different expectations from and attitudes towards other people.
3. They will fall into different patterns, each of which is suitable for a particular kind of activity.
4. These patterns of relationships will involve the members of the group in social roles. Upon the adequate carrying out of these the pattern will depend.

LEADERSHIP ROLES

Now it will already be apparent that the patterns of relationship in a great many group situations will tend to focus on one or two persons, whose roles will tend to have more influence in the general pattern than those of the remainder. So long as a lecturer continues to discharge his role, quite a substantial proportion of the others present can neglect theirs by dropping quietly off to sleep without the situation breaking down. Similarly so long as a supervisor is conscientious in his allocation of tasks and seeing that they are properly carried out, the working group may continue to be quite efficient even though the other members are not all entirely conscientious about carrying out their roles. These roles, on which the pattern of relationships depends to a greater extent than on the others, are the leadership roles, and in any group situation it is very important that they should be adequately filled. The pattern of relationships in most working groups will depend on a leadership role, and anyone who is put in charge of a working group will be successful or not according to how far he can fulfil the role that the situation requires of him.

Leadership is a social process: it depends on filling a certain role in a pattern of relationships in a group of people. That role will vary in different groups, and in different situations, some of which we shall look at in a moment, but it will always be at a focal point in the pattern. The quality of the relationships will depend upon it, for if all the bonds between the members of a group centre upon someone who is difficult, discourteous, and liable in most cases to arouse unnecessary resentment and bad feeling, these bonds will surely be disagreeable and unpleasant. On the other hand, if there is someone who is helpful, knowledgeable, well adjusted and mature at one end of most of the relationships between the members of the group, then these bonds are likely to be of much better quality.

In the same way the pattern of relationships will depend on the person who fills this role, for if he does not carry it out there will be a large gap at the most important point in the pattern. Other people will then begin to neglect or refuse their roles and in a very short time the whole situation will break down.

Different Kinds of Leadership

In certain group situations the pattern of relationships is laid down very rigidly and the roles of the individuals are defined in great detail and enforced to the letter. Quite obviously such a group will have an authoritarian character and considerable sanctions or powers of punishment will be necessary to maintain the pattern of relationships on which it depends. The slightest deviation from his role on the part of any individual must be effectively discouraged immediately it becomes apparent. Recruit training depots in the army were a good example of this kind of group situation, for minor infractions of discipline could be dealt with by a system of punishments enforced by N.C.O.s who understood exactly what was required of them.

The role offered to a leader in such a situation is in conformity with the rigidity of the pattern. He may maintain his position by using his powers of punishment and by insisting on the small details or gestures which mark the difference between himself and the rest of the group. Any failure to live up to the official pattern of relationships and roles might have a disintegrating effect on the group, for the rigidity of the structure is likely to make it unable to stand any severe strain. In actual practice, however, it is frequently found that this official pattern of relationships is supplemented by another unofficial and much more effective structure.

During a period of heavy unemployment it is possible to find these authoritarian groups in industry, for the power of dismissal or the threat of it is quite effective as a sanction to support the most rigid pattern of relationships. It is probable that in the late 1920's and 1930's, and perhaps as a hangover from earlier times, this situation prevailed, and the role of an industrial leader was thought of in terms of taking one's place in a rigid authoritarian pattern of relationships, supported by severe powers of punishment which were used ruthlessly to "keep others in their place" or ensure that they maintained their roles. The relationships in such a case would contain expectations of obedience on the one hand and domination on the other.

The Situation in Industry

For a number of years now, however, the situation in industry has been changing and with it the conception of a leadership role. Two main factors can be seen in action, the first of which is the quite simple and obvious change in the employment situation. Before the war there were well over a million unemployed and if a man were dismissed he could usually be replaced without much difficulty. Since the war there have rarely been more than about three hundred thousand unemployed, mostly for only short periods at a time, and if a man is dismissed he can often walk into another job the same day, while the employer may find a great deal of difficulty in replacing him. In these circumstances the principal sanction for discipline has disappeared, for apart from dismissal there are very few effective punishments available in industry. Without powers of punishment it is practically impossible to maintain a rigid authoritarian pattern of relationships.

The other factor is a change in outlook on the relationships between human beings in general. Fifty years ago it was quite natural to talk of "master" and "man," and the forming of relationships in which there was an expectation of obedience on the one hand and domination on the other was a normal thing. It was probably true also that the relationship carried an expectation and acceptance of the obligation to provide security of tenure at the same time, and that the breaking down of this element in the relationship led to the loosening of the whole. Be that as it may, however, the developments of the last fifty years have seen a gradual but definite movement away from the conception of "master-and-man" relationships in industry and very few employers have the self-confidence to expect implicit and unreasoning obedience from their workers. Very few workers, on the other hand, are prepared to put up with authoritarian discipline in a factory, simply because they happen to be employed there.

With this modification in the relationships within the working group there has come a change in the role of the leader. No longer equipped with powers of punishment, he is expected to elicit not so much obedience as collaboration from others. Unsupported by a rigid pattern of relationships, he is expected to maintain his position by his constructive handling of social situations and by his awareness of the needs of the group at any one time, for direction, planning, or the solving of difficulties. Provided that his workers are amenable to a reasonable approach this role may not be an impossible one and a sophisticated group structure, or one in which each member will understand and accept his role quite consciously, will be built up. In many cases, however, there is still a certain threat in the background in the shape of dismissal.

A New Conception of Leadership

In times of crisis, it is said, the moment produces the man; someone steps forward who can control the situation and everyone else turns naturally to him for direction. Be that as it may, we find more frequently that a leisure-time group, held together by no compulsion other than a desire to play some game together or promote some cultural activity, can produce from within itself people who can deal quite adequately with the leadership roles. Such groups are worth study for they show a voluntary acceptance of roles and a structure of relationships which is not at all rigid and which is maintained in existence by no sanctions.

Such groups might be called "sophisticated," because the members realize that a certain pattern of roles and relationships is necessary if the group purpose is to be achieved, and they accept this quite willingly without taking it any more seriously than the situation requires. This kind of situation might be illustrated by the captain of a local cricket club, who says to one player "Where would you like to field, Joe?" and Joe replies "I don't mind, Fred. Put me wherever you wish."

Fred then replies "O.K. Will you go to cover point, then?" An easy, good-tempered relationship, with no show of authority on one side, and a willing acceptance of direction on the other. In such groups the leaders maintain their position solely by their ability to fill the role which it demands. Having no sanction for their authority other than its acceptance by the other members of the team, they can be displaced at once if a small number of those members withdraw that acceptance.

It is not suggested that industrial leadership can ever approximate completely to this picture. The members of a working group have not come together voluntarily to work for the fun of the thing, nor can they ever be expected to identify themselves as completely with an industrial company as with their own sports club. Likewise it is probably impracticable to have the leaders of working groups appointed by popular election. Nevertheless, in these days industrial leadership may only be effective if it achieves some degree of acceptance from the led, and leaders may have to be chosen for their power to fulfil the role which is demanded of them under present-day conditions. This aspect of the leader's qualifications may come to bulk quite as large as his technical ability.

A new conception of leadership is therefore possible where the powers of punishment necessary to an authoritarian group-pattern are lacking. This will make serious calls on the leader, and it may make an equal demand on the led to accept their roles with only a minimum threat of coercion. In essence, however, there is no difficulty in putting such a conception into practice, other than the human limitations of the individuals concerned.

SUMMARY

1. How is a group held together?

Whenever two or more individuals have any personal contact with each other a bond or relationship will be formed between them. It is these relationships which make the difference between a group in the proper sense of the term, and a mere collection of individuals who happen to be in the same place at the same time.

2. Are these relationships between people uniform in quality and content?

Relationships between individuals can vary widely. They can, for example, be of a pleasant quality when one person regards the other as an agreeable, reassuring companion. Or they can be distinctly unpleasant when one person thinks of the other as an object of fear and suspicion. Relationships between individuals can also contain expectations of different kinds of behaviour, such as the giving or receiving of orders and the like.

3. How are the relationships within a group laid out?

Among any group of people the relationships will fall into some kind of pattern. This will vary according to the task on which the group is engaged, but in many cases it will focus on one or more of the members. This pattern of relationships will involve the members of the group in social roles, and only if these roles are carried out adequately will the pattern be maintained.

4. Where does the leader fit into this pattern of roles and relationships?

The roles which stand at the focus of the pattern of relationships are the leadership roles and on them a great deal depends. Standing as they do where most of the relationships centre, they will have an important effect on the quality of these relationships. Likewise the maintenance of the whole pattern of relationships will depend on them. Similarly the encouragement of other members of the group to sustain their roles will depend to a great extent on how the leader discharges his role.

5. Are there different kinds of leadership role?

In a group situation where the pattern of relationships is rigid and is sustained by sanctions and punishments, the role offered to the leader will be a rigid, authoritarian one. Where punishments are lacking and roles are accepted voluntarily, the leader must maintain his position by discharging his role in such a way that he is accepted by the other members of the group.

CHAPTER XXII

THE PRIMARY WORKING GROUP

Now that we have considered what goes on among people in groups and seen how a group depends for its existence on a pattern of relationships between its members, it will be apparent that the smaller groups where face-to-face relationships can be maintained are more likely to be significant than the larger groups where the relationships may be more distant. It seems to be generally accepted that the size of group in which these face-to-face relationships can exist is seldom more than about a dozen or so, and common sense tells us that in a group of this number individuals can work in intimate face-to-face contact with each other and get to know each other pretty well in the process. What goes on within these primary groups, therefore, is important from many points of view.

In the first place, these groups are the social cells of the organization, that is to say they are the smallest units in which people can work together. In the human body the biological cell is the smallest unit of living matter, and what goes on in the cell is of very great importance to the health of the body. If the cells are healthy the body will be healthy, but if the cells, or a proportion of them, are diseased, the body will be ill. In a company the social cells are of equal importance. If the relationships within the primary working groups are of good quality and the pattern into which they fall is suitable for the function of the group, then the team-spirit in the company as a whole will be a good one. But if the relationships within a significant proportion of the cells are poor then the team-spirit of the whole will be defective.

In the second place these groups form the immediate social environment of work for the individual, comprising the people with whom he is in contact for several hours at a time every day. Now our states of mind depend to a considerable extent on the circumstances in which we find ourselves and of these circumstances the other human beings are not the least significant. If we have to work throughout the day among people we dislike—with whom our relationships are of poor quality—we shall get little pleasure out of the hours we spend on the job and we shall look on it as irritating and tedious. The individual's state of mind, therefore, will be seriously affected by the relationships within the primary group.

Thirdly, working methods depend to a great extent on the administration within the primary group. This is a small-scale matter concerned with the minor arrangement of material, the allocation of tasks, and the day-to-day organization of work, but it is nevertheless important in determining the efficiency of the company as a whole. It is no use having methods worked out to fractions of a second if every time a batch is finished the operator has to wait half an hour before he is given another task. Such details do not depend on the planning department. They must be settled within the primary working group.

PRIMARY GROUPS IN AN INDUSTRIAL COMPANY

Every organization, no matter how large, must come down in the last resort to primary working groups. The very large company tends to be thought of as employing thousands of people all herded together in a large anonymous mass. But when we go to visit one of the company's plants and look at the work actually in progress we shall find half a dozen men working on one process here, a dozen over there tending a large machine, eight or nine somewhere else engaged on a common task. Most industrial work falls naturally into small groups, and even on those processes where a hundred people seem to be working in one large unstructured group we shall find on closer inspection that there is usually some form of subdivision, either a setter or mechanic, a relief hand or an inspector who looks after every dozen or so workers.

These small face-to-face groups in which the pattern of relationships is so significant are worth a great deal of study. But quite frequently they are not provided for in the official organization of the firm. It is not unusual for the last step in the management and supervisory hierarchy to be a foreman who is left in nominal charge of fifty or sixty operatives, with no subordinate charge-hands to take charge of the primary groups. This is an impossible situation, for obviously no pattern of face-to-face relationships can form between fifty people and there can be no one central point at which anyone is offered a significant leadership role.

In such a case the official organization of the group is obviously unworkable except on a very artificial and unreal level. What happens in actual practice is that an unofficial form of organization comes into being, primary groups forming themselves spontaneously, and little patterns of relationships growing up unnoticed in the course of the work. The small groups into which people naturally fall in the course of work develop their own organization, while other unexpected groupings may also come into being. Now if these patterns of relationship remain completely unofficial a number of quite important things may happen which may remain beyond the control or even the knowledge of those who occupy the key positions in the company's official organization.

For example, the roles demanded by the unofficial pattern of relationship may be quite different from the official roles in the organization. Similarly the qualities of relationship and the expectations of behaviour they involve may be so different that they may in fact conflict. Most important of all, of course, is that the unofficial groupings will offer unofficial leadership roles to people who have no place in the formal organization of the company. These leaders, being purely spontaneous creations, will depend for their position on their ability to achieve the group's unofficial objective, but if they appear to be doing so at all effectively they will have a very real control over the rest of the group because of the face-to-face primary group relationships which hold it together.

The Unofficial Primary Group

Bringing all this down to practical terms, let us imagine that we have a department of sixty operatives under one supervisor—a number which is too large for any pattern of primary group relationships to form in. Suppose that ten of these people are working together on some process which involves some small collaboration between them and which brings them into some physical proximity to each other. Inevitably relationships will form between these ten people which are closer and more direct than those between them and the rest of the department. The pattern may be rather indefinite but it will be very unlikely to include the official supervisor of the department whose appearances will probably be relatively infrequent.

As the work proceeds minor difficulties will inevitably arise, and an impression may get around that the supervisor (official) is not doing as much as he might to deal with these and to facilitate the group's task. An opportunity is then provided for someone to say "Of course, no one cares what happens to us. We sweat our guts out to get production through in spite of difficulties and so long as the output keeps up we can ruin our health for all anyone else notices. '*They*' aren't blooming well interested in us as human beings." Everyone feels like that at times and there is bound to be some agreement from the others. The pattern of relationships will adjust itself for the moment to centre on the person who has thus expressed the common attitude of the group.

Now it is not impossible that the individual who comes thus into the centre of the pattern, however momentarily, may have an opportunity to express an official protest or in some way to contribute to easing the strain on the group or facilitating its work. If this happens he will tend to confirm his position of leadership in protecting the group from exploitation or in giving expression to its dissatisfaction. The pattern of relationships which centred momentarily around him will become more definite and permanent and some expectations will develop that he will continue to represent the group's point of view to the official hierarchy of management. This process has only to continue for a few weeks for this individual to become accepted in a leadership role among that primary group, and for another appointment, unofficial and carrying no responsibility, but quite real and effective, to be made within the company.

Primary groups of this nature, which form under unofficial leaders, tend inevitably to be to some extent in opposition to the formal organization of the company. Their purpose is usually self-protective, their relationships in a defensive pattern centring on the individual who can best carry out the defensive purpose, and their attitudes towards the company and its purposes rather suspicious and possibly hostile. The difficulty is, however, that being primary groups, the relationships within them have a face-to-face quality which is more significant in the lives of the members than the rather unreal official relationships expected by the unworkable formal organization. Moreover, such groups have come into being to fill a kind of social vacuum where a primary group was a necessity but had not been provided for.

It is not our purpose to consider intentionally subversive activity in industry, though a certain amount is usually carried on for one motive or another. One cannot fail to be struck, however, by the opportunities which are provided gratuitously for subversive elements when the formal organization of a company fails to take account of the necessity for recognizing the primary groups which must inevitably form at work.

THE RECOGNITION OF LEADERSHIP ROLES

To cope with such a situation, which obviously has serious potentialities, it is necessary to carry a company's organizational framework right down to the actual working point. This might at first glance seem to involve a serious increase in the numbers of supervisory appointments. What is required, however, is not the multiplication of people who are supposed to "take charge" of others at work, but the recognition of the leadership roles which exist within the primary working groups in which the work is carried out. These will mostly be filled by working charge-hands, leading hands, setters, inspectors, and a host of other people who exist already but whose jobs have been recognized mainly for their technical or administrative content rather than for their social or leadership content. Quite a minor change could make a great deal of difference. This would be to recognize officially that such tasks involve a leadership role, and to make its satisfactory carrying out one of the duties of the job. The role will vary from one job to another but in every case the individual who occupies it should be held responsible for the quality of relationships within the group, for taking and keeping his proper place in the pattern, and for ensuring that the other members duly carry out their roles.

In certain cases the natural leaders of the primary groups are more willing to accept their technical responsibilities than the leadership duties which belong to the position. In the weaving trade in Lancashire, for example, the obvious primary group leader is the overlooker or "tackler" who takes charge of a manageable number of looms and operatives. But while accepting the responsibility for the maintenance and adjustment of the looms, the overlookers have refused to be held responsible for the discipline and management of the operatives, with the result that there is no one between the mill manager and perhaps a hundred or so weavers; the mill manager's job thus becomes an impossible one.

Where natural primary group leaders exist, as they usually do in most industrial situations, they should be held responsible for every aspect of the role. This will include not only technical and administrative duties in the care of machines and the handing out of work (allocating duties) but also a human element in the maintenance of the quality and the pattern of relationships. They must ensure that the other members carry out their roles adequately. They must be sure also that they do not overlook the protective aspects of the leader's role, because if they fail to represent the group's point of view or to play their part in gaining recognition for it and facilitating its duties, there will always be someone ready to step in and take over these more agreeable aspects of the role. This is what happened in the example quoted above, and in any dual-control situation like this it is usually the protective or "mother" figure whose role is the more significant while the authoritarian or "father" figure suffers by comparison and gradually loses significance, particularly in a situation where the powers of punishment necessary to authority are lacking.

Another aspect of this situation is that the leader of the primary group must accept a second role in another group—that of subordinate in the next above. Referring again to Fig. 48 on p. 253, which shows the component groups of which an industrial company is made up, dotted lines will be seen connecting each group with the next. But the same person appears at either end of these dotted lines, in one group occupying a leadership role and in the other a subordinate one. It is by playing these twin roles that managers and supervisors hold a company together, or form the essential links between the groups of which it is formed. Experience in the training of supervisors suggests that it is the subordinate role which in fact gives them most trouble. They do not seem to find their leadership roles too difficult, and, provided that a supervisor knows his stuff and is reasonably sure of himself, this is easy to understand. As a subordinate, however, he will find himself quite frequently the bearer of bad news in the shape of difficulties or delays on the job; he will have to put forward awkward requests and point out that unless they are met the job will suffer, he will have to tell his superiors things they do not like to hear. A little reflexion, therefore, will show why the subordinate role may easily have the more unpleasant aspects of the two. It is nevertheless quite as necessary to the effective working of the company as the leadership role.

When we really study what goes on in the primary group we shall find that unless the occupier of the leadership role carries out all the aspects of that role the pattern of relationships which depends on it cannot be maintained. Some aspects of this role may be a little unwelcome, such as the necessity for the chargehand to represent the group's point of view. There is a danger if he does so that he will be accused of "taking the side of the men"; but if he does not undertake this aspect of his role he is immediately leaving the way open for an unofficial competitor who may step into the vacant place and build up a new leadership role and a new and unofficial pattern of relationships.

THE SELECTION OF LEADERS

Another problem which this approach to industrial organization poses is that of finding the right people for leadership positions. It is quite obvious that technical qualifications or experience alone will not enable a man to take charge of a working group, though he will be unable to do so without them. He must have all the qualities necessary to fulfil the different aspects of his role and these will include the ability to understand people and to establish and maintain the right kind of relationships among them; this in turn demands an ability to understand and control himself. In the job-specification for any supervisory position therefore, a social pattern of interests and a well organized disposition must bulk large.

In the past supervisors have frequently been selected for their technical qualifications and experience, and many people have been appointed to such jobs who clearly lack the other qualities required. This has obviously resulted in poor relationships and morale in the company as a whole and in the primary groups in particular, but nevertheless companies have continued to operate. How has this been so?

Partly because in the past the semi-authoritarian set-up backed by the threat of dismissal has kept many problems under the surface and enabled many otherwise unsuitable supervisors to maintain their positions; this situation has now changed and with the overall difference many problems are coming out into the open. The main reason, however, has been that in such cases supervisors reached some kind of working compromise between the aims of management and what the working group would accept.

Where the self-protective organization of the group is well developed it will be expressed in restrictive practices and customs, such as working to traditional standards of output, promotion to certain jobs by seniority rather than by merit, and the like. All these will provide means of frustrating any attempt to improve the efficiency of working. Where they are well established it will be impossible for a supervisor to get things done as he knows they could be done. He must content himself, therefore, with getting as near the desired level as he can.

If we revert for a moment to Taylor's early experience, as described in Chapter XVI, we shall see the kind of compromise which has to be arrived at when management stops short with its feet off the floor, that is when it does not reach down to the primary groups. Taylor's shop in the Midvale Steel Company was in the hands of unofficial leaders who, expressing the self-protective desires of the primary working group, had set up and maintained a set of working standards which represented in his opinion about a third of what could be achieved. His predecessors had acquiesced tacitly in these standards and were maintaining an uneasy compromise between the official purpose of management and the unofficial self-protective leadership on the floor of the shop. When Taylor appeared and refused to accept this compromise three years of bitter conflict ensued. This conflict will always occur when differences between the official and unofficial organization of a company are forced to an issue, particularly when the unofficial organization at the primary group level is well established.

SUMMARY

1. What is the maximum size of the primary working group and why is it important?

The intimate, face-to-face relationships on which a primary group depends cannot be formed among more than, say, a dozen people. Primary groups are important in an industrial company because they form the smallest social units within it, because they are the immediate social environment of the individual worker, and because the methods and team-spirit which prevail there will determine the efficiency and relationships within the whole company.

2. Are these primary groups normally provided for in industry?

In the sense that most industrial work falls into small groups of up to a dozen or so, yes. In the sense that these groups are provided for in the plan of organization and provided with official leaders, no. Too often the official organization of a company comes to an end well above the primary group level.

3. What happens when the primary groups are not recognized officially?

Whenever the official organization of a company fails to provide for the primary groups, unofficial primary groups will spring up. These will usually have a self-protective purpose and they will offer roles to unofficial leaders whose aims will not necessarily be in harmony with the official aims of the organization.

4. Is it practicable to extend the official organization of a company down to the primary groups?

Most industrial work falls naturally into primary groups and there are a number of roles, such as those of setters, overlookers, and the like, which are in effect leadership roles. In many cases, however, these are recognized only for their technical content and not for their human content. If such people were held responsible for the whole of their leadership role—for the relationships and team-spirit among the group as well as for its technical working—management organization would extend to the primary working groups.

5. How far does this involve a change in existing methods?

The organizational changes need be very slight. It would however involve a serious change in the methods of selecting supervisors, for their personal qualities and their technical knowledge would have to be considered as of equal importance. Similarly they would have to be recognized in some degree as the spokesmen of their groups. In the present situation many charge-hands are having to acquiesce in an uneasy compromise between the aims of management and the self-protective organiaztion of unofficial primary groups.

CHAPTER XXIII

ENTRY INTO THE GROUP AND GROUP ATTITUDES

THE intimate life of a face-to-face primary group is probably the most significant aspect of the relationships of large numbers of people working together, and some understanding of it is essential to a proper appreciation of the problems of leadership and morale. But over and above these direct relationships, there are common ways of thinking among all the members of an organization which are essential to its functioning and which the individual who joins it must learn before he can become an effective member of it.

It is obvious that in any organization engaged on a technical job there will be a number of technical terms which are meaningless at first sight to the layman. Not only will he have to learn the meaning of the words, but also he must acquire some appreciation of the techniques and processes which they denote before he can take part in any useful discussions within the organization or even understand what people are talking about. So much would probably be accepted by everyone and the need for a period to "learn the language" would be recognized.

But even in non-technical organizations the newcomer will find himself at a loss until he learns his way about the building and something of its organization. He will want to find out whom to ask for certain things, who gives him instructions about what he must do, and the names of a host of people who at first sight will seem bewildering and strange. After a while he will gain some confidence in his knowledge and will find that he knows enough to be able to get through an ordinary day's routine without having to ask too many questions.

At this point, however, he may experience a rude shock, for he may find that there are certain ways of looking at things commonly accepted in this organization which are substantially different from what he has been used to. For example, he may have come from an organization where no one paid much attention to minor amounts of scrap and he may allow himself a certain margin of waste material. He will be very surprised, therefore, if in his new firm someone, not necessarily a supervisor, says to him "What do you want all that for? It's valuable material which somebody has to pay for. There's no point in wasting half of it just for the fun of the thing." From then on he may realize that the way of looking at scrap and other things may be quite different from what he has been used to.

ATTITUDES

These "ways of looking at things" are known as attitudes. In most cases they are largely unconscious, people having absorbed them from those among whom they have lived. Take, for example, the word "nationalization." If one has lived in a traditionally Conservative business background this word will probably call into play a somewhat unfavourable attitude in one's mind, compounded of tag ends of sentences like "bureaucratic inefficiency," "stifling private enterprise," "jobs for the boys," "excessive centralization," all adding up to a general feeling that "nationalization is a bad thing." But if on the other hand one has been brought up in a traditionally Labour, Socialist or trade union background, one's mind will probably fill with phrases like "condition of economic justice," "protection against capitalist exploitation," "public ownership of the means of production," all adding up to a general feeling that "nationalization is a good thing."

If by chance you have thought seriously about the subject, reading the arguments for and against, trying to gather information about the relative efficiency and conditions in privately and publicly owned industries here and abroad, and reaching your decision after an honest effort to weight the advantages and disadvantages of nationalization, these words do not apply to you. But if they do have some approximate resemblance to your mental processes when the word is mentioned they will give you some idea of your "attitude" to that particular issue. You will realize also how far your thinking about many subjects is conditioned by your attitudes, many of which you take for granted, remaining unaware how irrational and unconscious they are.

In any group of people there will be common attitudes to most of the day-to-day issues which arise in the course of the normal routine. It may, for example, be unanimously considered a bad thing to work too hard (one remembers at school how offensive it was to call anyone a "swot"). Or it may be thought wrong to take orders with good grace and right to make difficulties and argue a bit before doing what one is told. Or it may be commonly held that this is a bad firm to work for, that workers are exploited, and that the new canteen is simply another means of "getting away" with something by making the workers think that they are better off. Even though the justification may be slender or non-existent, these views may pervade the group, being held with considerable devotion, and any refusal to agree with them may be courting extreme unpopularity and the risk of rejection. The strength of an attitude has little to do with its inherent probability or even its relation to the facts of the case.

ENTRY INTO GROUPS

The existence of these attitudes raises a number of questions some of which are concerned with the entry of newcomers. A new entrant may be trained in the technique of the job and in the formal organization of the company but he will neither feel at home nor be accepted by his colleagues until he is familiar with the prevailing attitudes and until other people are confident that he shares them wholeheartedly. The most obvious social *gaffe* that one can make is to show enthusiasm for something in a social group where the prevailing attitude to the particular issue is negative and disparaging. Such a performance shows up the fact that the individual is either unaware of or indifferent to the group's attitude to that particular topic.

In some groups this kind of failure may entirely prevent the individual from being accepted. Such groups are rigid in their standards and particularly hostile to any suggestion that they are not universal and absolute. They will thus have a very low capacity for assimilating newcomers, as in the case of rather isolated village communities where new arrivals are thought of as "foreigners" for perhaps the first ten years of their residence. Certain industrial groups may be rather like this—very fixed and set in their ways and liable to make it difficult for new entrants for an unnecessarily long time and on quite irrational grounds. At times one may even find the hostility to a newcomer being expressed in unkind practical jokes (such as sending him to ask for a left-hand screwdriver) or even in a degrading initiation ceremony like those found among primitive peoples.

Some individuals, of course, make their own acceptance difficult because of the rigidity of their own attitudes and their low level of acceptability to other people. Not only are they insensitive to the fact that other people may react differently to certain events, they also take no pains to conceal the fact that they have their own ideas. If someone like this arrives in a group where rigid attitudes make it difficult to assimilate newcomers the stage is then set for a conflict which may be prolonged until one or other gives way, or until the community decides to accept the newcomer with reservations ("He's a bit queer, you know, but still . . .") and the individual makes a partial adjustment to the group ("They're pretty backward, one has to humour them a lot").

The ease with which a newcomer can fit into a group, therefore, depends on two variables. One of these is the group's capacity for assimilation which may vary from a very low level in the rigid and suspicious groups referred to above, to a very high level of sophistication. There are cases where a social unit on receiving a newcomer may say, more or less explicitly "Well here you are. We've got to live together so we might as well make the best of it. So long as you don't offend other people you will be accepted and we'll do our best to get along together." The other variable is the individual's level of acceptability. This may range from rigid attitudes and considerable suspicion of those who do not share them, which will make a person unfit for anything other than his own familiar background, to a high level of sophistication where an experienced person can refrain from showing surprise or disapproval at unusual attitudes and can make some kind of adjustment quickly to any social unit. In other words some groups will be able to assimilate almost anyone and some individuals can fit in almost anywhere, whereas some groups will regard any newcomer with hostility and some individuals will find it difficult to fit in wherever they are. In any particular case the speed of assimilation will depend on the relation between the group's capacity to take in new people and the individual's level and range of acceptability.

Assimilation of the Handicapped Worker

Among normal people of approximately the same background this does not usually present much of a problem, but there are certain types of people where some difficulties may be anticipated. Among these are the disabled or the physically handicapped, because in such cases there may be drawbacks on the part of both the group and the individual. There is an unfortunate tendency for physically normal people to have an aversion from anyone who shows outward signs of abnormality. Among primitive people, for example, those who are deformed are often treated with great harshness, or even put to death, and though in a civilized community we make an effort to treat such people with kindness and consideration we are not always as successful as we would like to be in concealing our distaste for, say, the sight of a man with no legs. When such a person is introduced into groups, therefore, there may be an increased difficulty in his assimilation because, however hard the other members may try, they may not entirely overcome their dislike of his abnormality; or what may be even worse, they may overdo their efforts to be kind and considerate to him and after making a quite disproportionate fuss in the early stages end up by being bored and irritated with him and with themselves.

On the other hand, however, the unfortunate individual who is disabled or handicapped may find it very difficult to adjust to his own limitations. It is not pleasant to feel oneself different from others and it is hard to avoid feeling sorry for oneself and resentful toward others because they do not suffer in the same way. This may result either in the handicapped individual demanding an undue amount of consideration from those among whom he lives or in his swinging to the other extreme—trying to show that he is just as tough and able as the next man and brusquely refusing reasonable offers of help and consideration. In addition, therefore, to the difficulties of assimilation on the part of the group there may be a lowered level of acceptability on the part of the disabled person which arises from the feelings of uncertainty and inadequacy which his disability has engendered in him.

Very often it is issues like these, rather than the finding of work for which they are physically fitted, which make it difficult to rehabilitate handicapped workers and fit them into industry again. The same problem arose after the war with the returning service man or ex-prisoner-of-war, who, though he was perfectly fit and healthy, yet found that his long absence and separation from civilian life made it difficult to settle down to a peace-time job again. Very great demands are thus made on the tact and sympathy of the supervisor and on his understanding of the situation when handicapped people join a working group.

The Neurotic

But there is one type of disabled person who presents a particularly acute problem because the very nature of his disability implies a difficulty in adjusting to other people. This is the neurotic, and an alarmingly large percentage of such people are said to exist in the modern world. Some account of the commoner emotional difficulties was given in Chapter VII. Some people suffer from these and similar dispositional handicaps to such an extent that they cannot build up stable and workable relationships with others, though they are in no way dangerous to themselves or their fellows, and no question arises of their being put into special institutions. People with very low intelligence (mental defectives), though not necessarily neurotic, raise similar problems.

In absorbing this type of person into industry it is necessary in the first place to realize that we are dealing with individuals whose level of acceptability is usually very low. Consequently it will only be possible for them to fit into groups in which the capacity for assimilation is very high. In practice this will mean that the supervision must be particularly sympathetic and the other members of the group capable of making allowances to a more-than-average degree. The kind of strain to which they will be subjected will not simply be that of having a "difficult" person among them, but rather one who may go out of his way to make fantastic allegations that other people are discriminating against him or even plotting to injure him. Not many people can continue to be sympathetic and reassuring in the face of this kind of thing and often the unfortunate neurotic has to take himself and his pitiful delusions back to the Employment Exchange in the hope that the Disablement Rehabilitation Officer's patience is more durable than that of his former colleagues.

It is for consideration whether the rehabilitation of neurotics in industry is not a problem where only a low level of success can reasonably be expected and whether special arrangements ought not to be considered for the more intractable cases. During the war, for example, it was found that men of very limited intelligence who had found their way into the army were making very little of it. They found it impossible to pick up the normal basic training of a soldier, they found difficulty in keeping themselves or their equipment in a satisfactory state—in fact the situation was quite beyond them. The people round about them, who were probably none too secure themselves, tended to make fun of them more or less unkindly, while the N.C.O.s showed no more patience than could be expected under war conditions.

Faced with such an intolerable situation there was a grave temptation to escape from it by going absent, thus adding a serious military crime to their already substantial list of minor offences. They found the conditions in the detention barracks even more intolerable than normal soldiering, as indeed they are designed to be, and thus a vicious circle of inability to cope with the situation, crime, punishment, and an increased inability to cope was set up. Such men were of no use either to the army or to themselves. They were bad soldiers, they were miserably unhappy, and under the existing conditions there was little or no hope of improvement.

Under the general direction of Sir Ronald Adam, the then Adjutant General, these men of limited intelligence were put into special companies, known as Unarmed Pioneer Companies. They were not required to complete the normal military training such as learning to handle weapons, and they were employed only on the simple tasks which were well within their limited capacity. They were commanded by specially selected officers and N.C.O.s and they were given welfare services on a scale rather above that of normal units. This last measure proved advisable because in many cases their home affairs were in a very unhappy and confused state.

Once these companies were formed the change was dramatic. Crime dropped and morale improved. The "King's hard bargains" began to take a pride in themselves and in their units, the difference being at once noticeable in their improved appearance and in the way they carried out their duties. In other words, having been placed in a situation which had been arranged to take some account of their limitations they were able to achieve a satisfactory adjustment to it. When the war ended and they returned to civil life, unfortunately, they found the adjustment to normal employment beyond them, and in many cases they slipped back into casual short-term jobs with the same wretched pattern as before.

THE STUDY OF ATTITUDES

If the attitudes within a working group are so important, can anything be done to find out something about them? This is a problem which has occupied attention for some years and there are various methods available which can estimate more or less accurately what groups of people are thinking about certain things. The simplest of these is the opinion poll in which the whole group, or a large enough number to form a representative sample, are asked a series of standard questions by an interviewer. The published results of these polls which appear round about election times are probably familiar, but they can be, and are being, used to find out people's attitudes to a great many other things. The method is essentially simple, depending mainly on two things—

1. The sample must be large enough to be representative and it must include all the different categories of people in the group in the proper proportions. For example, if opinions on vivisection were being sought it would be unwise to invite people to come forward voluntarily to give their views, as this would almost certainly result in all those who felt strongly that vivisection was a bad thing accepting the invitation and thus overloading the sample with anti-vivisectionists. It is necessary to include men and women, older and younger,

better-off and poorer people in similar proportions to the numbers in the total group to be studied.

2. The questions must be devised so that they elicit an unbiased and honest reply. For example, if we say to a number of people "I suppose you go to Church fairly regularly?" many people would say "yes" whose attendance could only by the wildest stretch of imagination be called regular. A more reliable result would probably be gained by asking what the individual did last Sunday and perhaps the Sunday before. There is also the question of bias in the interviewer who may interpret the replies unconsciously in a manner which suits his own preconceptions. A great deal of experience has been gathered on these matters, however, and any reputable organization can avoid most of the pitfalls and produce very reliable results.

But while polling and questionnaire methods properly applied will provide an indication of people's attitudes to a few simple issues, there may be times when a more detailed survey is required. In such cases the non-directed interview may be used and a representative sample of the group interviewed at greater length. Interviews like this are permitted to take their own course, the interviewer simply encouraging the other person to talk while noting what he says and occasionally referring it back to him in the shape of a summary—"You feel that in this company too much attention is paid to so-and-so." Occasionally specific topics are raised in order to give the person interviewed an opportunity to say what he thinks about them, but for most of the time the interviewer is more interested in seeing what he talks about and what attitudes he displays on those subjects.

The results will be that at the end of, say, a hundred interviews, the position will be like this—

90 per cent of people have mentioned the canteen;

85 per cent of whom have shown a negative or disparaging attitude towards it.

70 per cent of those have tended to go on to say "Well, what do you expect? In this firm they're only interested in production. We don't count as individuals."

80 per cent of people have mentioned the supervisory and management staff in disparaging terms;

60 per cent of whom have said they don't know their job and have been promoted only by influence;

50 per cent of whom have said they never see the boss in person.

5 per cent of people only have mentioned the firm's products, none of whom have shown any pride in them.

etc.

From such a result it will be apparent that the state of morale in that particular company is not very high. Moreover, there are indications of what is wrong—lack of any feeling of identification with the company or its products, poor communications within the firm, failure of supervisors to take their proper role in the primary groups, and so on.

The surveying of attitudes by non-directed interviews is a delicate matter and it requires considerable training and experience to interpret the results. The matter is complicated by the fact that in many cases people complain about inessentials, which can be shown quite convincingly to be perfectly satisfactory, thus making it appear that the actual complaints are frivolous. Such complaints, however, usually mask something much deeper and more significant, about which the person interviewed is unwilling to talk directly.

Interpreting the Results of Attitude Surveys

In this field of study it is not difficult to provide oneself with material. Anyone can put together a questionnaire or conduct a few interviews. What is difficult and delicate, however, is to be sure that the material collected is significant and reliable and that it has been properly interpreted. This requires a great deal of training and experience.

Complaints, for example, which can be shown to have no basis in fact, may in the hands of an experienced person be found to be symptomatic of unsatisfactory general attitudes to the company. Patient investigation, moreover, may show how these attitudes have arisen and what are their real causes. It is not unknown for a series of irrational grouses about the canteen food to lead to the discovery that the relationships centring round one badly adjusted supervisor were thoroughly unsatisfactory.

When a survey shows that the attitudes within a company are unsatisfactory, can anything be done about it? In the short term probably very little can be done, for if a worker has come to feel after many years that he is being exploited it is useless to prove to him with a mass of figures that he is not. Specific difficulties or complaints can be dealt with at once, but lack of satisfaction in work or lack of any sense of identification with the company can only be tackled in the long term.

So many things can go wrong with workers' attitudes in modern large-scale industry. Many processes are so subdivided that the individual's job has little meaning for its own sake and the individual has no sense of doing anything useful. Gaps in the supervisory levels, such as were described in the previous chapter, interfere with the development of a sense of identification and community of purpose within the firm. Poor relationships within the primary group play their part, while over all broods the legacy from the last century when industrial relations and conditions were very unsatisfactory indeed and when unregulated exploitation of the workers' inferior bargaining power was far from uncommon.

A great deal can be done by improved induction training designed to show the new entrant what the firm does, how it works, and where he fits in. In the same way modern advertising and propaganda methods can do a great deal to inform the workers about current developments and their importance. Formal joint consultation also has a contribution to make in providing opportunities for workers to give their views through their representatives on matters of general concern.

There is, however, a danger that these methods may fail in their effect because they are artificially superimposed on an unsatisfactory structure and do not become an integral part of it. Good relationships start in the face-to-face groups of which a company is made up, and the major part of the information on which its happy and effective working depends must pass up and down its normal communications network. If either of these is unsatisfactory there is a danger that the situation may be made worse, not better, by substituting new networks of communication which may short-circuit the old, and new group relationships which may emphasize the unsatisfactoriness of the others.

SUMMARY

1. Is there anything notable about the ways of thought within an established group?

In addition to specialist terms and processes, an established group will have its own values and ways of looking at things. These last may be termed "attitudes." In many cases they are implicitly accepted rather than expressed in definite terms, having grown up unnoticed and irrationally.

2. How do these attitudes affect entry into the group?

Until a newcomer is seen to be versed in the group attitudes, and until he gives evidence of sharing and accepting them, he will not be fully assimilated into the group. Groups where the attitudes are very rigid and irrational will have great difficulty in assimilating newcomers. Individuals, on the other hand, who are set in their own attitudes and insensitive to those of others will have difficulty in being accepted by new groups.

3. Are there any particular difficulties in the assimilation of handicapped individuals?

There is an unfortunate tendency for the normal person to dislike any form of abnormality. This may be expressed in a horror of the handicapped individual or in its opposite, an over-effusive attempt to overlook his disability. The handicapped individual, on the other hand, may be tempted by his difficulties into self-pity, or its opposite, an irrational attempt to do without help and to disregard his handicap. All of this will make it specially difficult to assimilate the handicapped person into a normal group. These difficulties are particularly acute in the case of neurotics.

4. How can attitudes be studied?

Polling methods, which involve asking a representative sample specific questions, will reveal the attitudes of a group to specific questions. Non-directed interviews may be used to investigate a wider range of attitudes. These latter will reveal a great deal that is irrational, and experience is needed to sort out what is significant and relevant. The interpretation of what is revealed by attitude studies is a matter of some delicacy.

5. What can be done to replace unsatisfactory attitudes by more positive ones?

Owing to the fact that attitudes are implicitly accepted rather than openly expressed, and that they are often irrational rather than based upon adequate information, not a great deal can be done to change them in the short term. Induction training and propaganda have some effect, but to build up a real sense of identification with a company there is no substitute for good communications and good relationships in the small face-to-face groups of which it is composed.

CHAPTER XXIV

THE HAWTHORNE INVESTIGATIONS

BETWEEN the years 1924 and 1932 a number of studies were carried out at one of the Western Electric Company's factories in the town of Hawthorne, near Chicago. These have come to be known as the Hawthorne Investigations; they have been very fully written up and are full of valuable information on the social psychology of industrial work. They are in fact a series of situations designed so as to bring under control all the known factors which might affect performance at work. Their main value lies in showing that the most important factor in each case was the unknown one which escaped control.

The investigations started with a study of lighting. It was known that better lighting had a beneficial effect on output, but there were some doubts as to what was the best level of illumination for particular kinds of work. To find out about this, "experiments" were made in which two parallel groups on the same kind of work were observed, one being kept under standard conditions of lighting while the other was subjected to variations. For a while all went according to expectations, the group in which the lighting was increased improving its output with each change in the lamps. But soon a few unexpected results came to light. The "control group" in which the lighting was kept standard and whose output was expected to remain constant, showed a tendency to increase its output also. This threw very considerable doubts on the whole procedure and these were more than confirmed when the lighting in the experimental group was decreased, with the result that output still went up. There followed a period in which lamps were changed more or less at random, being sometimes replaced with those of higher power, sometimes with those of lower power, and sometimes with those of exactly the same power. The trend in output showed no relation at all to the changes in illumination, except for a tendency to increase with each change in both the experimental and control groups. At one stage two operatives worked with an illumination intensity of 0·06 foot-candles, which is about the same as ordinary moonlight. There was no fall in their output.

It was quite obvious by this time that the "experimental" procedure was inadequate to the situation. It had been assumed that all the other conditions at work had remained standard while the level of illumination alone had been varied, but as no correspondence had been found between changes in the lighting and changes in output it seemed the obvious thing to bring all aspects of the work-situation more closely under control, to introduce changes one at a time and to try to find out more about the effect of these changes as they occurred. Consequently the best known of the Hawthorne Investigations was initiated—the Relay Assembly Test Room. This ran from April, 1927, until the summer of 1932—more than five years.

THE RELAY ASSEMBLY TEST ROOM

Five young women were segregated into a separate room divided off from the production department by a high wooden partition. They were looked after by a service-hand who brought the materials and took away the finished work, and they were supervised by an observer who undertook to record what happened, maintain a friendly atmosphere, and exercise a general oversight. This observer was in fact a social scientist who had been mainly responsible for initiating and planning all these experimental studies. The work they were engaged on was that of assembling telephone relay units, which involves putting together a number of small components on a jig and fastening them with four screws. It was essentially a routine repetitive job of short cycle, that is to say each unit took about one minute to complete. A recording device was fixed up beside each operator so that when she dropped the finished relay through a chute in the bench a mark was made on a tape moving at a constant speed. Job, bench and working methods were the same as in the larger department from which the girls, who were all experienced operators, had originally been drawn.

The investigation started with the obtaining of records of performance of the five girls while they were in the ordinary

Relay Assembly Test Room

Summary of Experimental Conditions and Output Changes

(from Urwick and Brech, *The Hawthorne Investigations*, pp. 35–7)

Period No.	Date and Duration	Conditions and Special Features	Hours	Pauses	Output
I.	March–April, 1927 (Two weeks)	In ordinary department. Standard conditions	48	—	(Recorded individually without operators' knowledge, to give a base: 2400 per week)
II.	April–May, 1927 (Five weeks)	Transfer to Test Room. Standard conditions	48	—	(Period of adjustment to new conditions). Output rising
III.	June–August, 1927 (Eight weeks)	Group piece-work scheme for the Test Room alone (i.e. Group of 5 instead of 100)	48	—	Definitely increasing
IV.	August–September, 1927 (Five weeks)	Two 5-minute rest pauses. Overall hours unchanged	47·05	2 × 5 min	Level
V.	September–October, 1927 (Four weeks)	Two 10-minute rest pauses. Overall hours unchanged	46·10	2 × 10 min	Sharply up; bigger rise than in any period so far
VI.	October–November, 1927 (Four weeks)	Six 5-minute rest pauses. Overall hours unchanged	45·15	6 × 5 min	Slight falling off. Girls complained of the "interruptions"
VII.	November, 1927–January, 1928, (Eleven weeks)	Two rest pauses; 15 min a.m. and lunch given by the company; 10 min p.m.	45·40	a.m. 15 min p.m. 10 min	Output back to high level of V

VIII.	January–March, 1928 (Seven weeks)	Stop work at 4.30 p.m.	43·10	,,	Both sharply up
IX.	March–April, 1928 (Four weeks)	Stop work at 4 p.m.	40·40	,,	Average hourly rose. Daily and weekly total fell slightly
X.	April–June, 1928 (Twelve weeks)	Back to 5 p.m. stop, i.e. same as in VII	45·40	,,	Average hourly down. Daily and weekly up to highest level yet
XI.	July–September, 1928 (Nine weeks)	Saturday morning off	41·40	,,	Unchanged from X except for slight recession in weekly total, but this still higher than any period except VIII and X
XII.	September–November, 1928 (Twelve weeks)	All previous changes withdrawn and return to conditions of period III, i.e. ordinary standard, but retain own group piece-scheme	48	Nil.	Hourly slightly down. Daily and weekly up to record high level (3000 per week)
XIII.	November, 1928–June, 1929, (Thirty-one weeks)	Back to conditions as in period VII but Company supplied coffee only (i.e. own food)	45·40	a.m. 15 min p.m. 10 min	Increase to new high record (above XII)
XIV–XXIII.	June, 1929–July, 1932	Continuing as for XIII	45·40	,,	(Not relevant in present context)

N.B. Period VII became virtually a standard of conditions for the rest of the experiment.

department. This was done without their knowledge and served to provide a kind of base-line on which future performance could be evaluated. They then moved into the test room where they spent five weeks working under the same conditions of hours and rest pauses as in the ordinary department. The first change that was made was to form the five operators and the service-hand into a single group for the purpose of calculating piece-work. This was apparently more of an administrative change than an experimental one, for the whole department had hitherto been considered as one group for piece-work purposes, whereas it seemed more convenient to pay these six on the basis of their group output. The result, however, was to step up output which had already been showing signs of increasing ever since the girls had come together in the test room.

Then followed periods when rest pauses of various lengths were introduced. Details of these will be found in the accompanying table, along with notes on the changes in the level of output. They were eventually standardized at fifteen minutes in the morning and ten minutes in the afternoon, a snack being provided by the company (period VII). About this time an event happened which has received scant notice in most of the books written about the Hawthorne Investigations. Two of the operators who adopted rather an unsatisfactory attitude to the programme, who were not co-operating, and who were failing to fit into the group, were returned to the ordinary department and replaced by two who were more satisfactory from these points of view. These remained until the end of the investigations.

The next few changes were concerned with shortening the total hours worked either by stopping earlier in the afternoon or by not coming in on Saturday morning. These were accompanied by further increases in production either in the total output for the week or in the hourly rate. Leaving aside the changing of two operators, therefore, the picture presented by this segregated group up to the present had been one of changes in hours and rest pauses, each accompanied by a rise in the level of output. Now, to find out whether these changes had been responsible for the increases, it was proposed to go back to the original conditions, cutting out the rest pauses and refreshments and lengthening the hours to the original standard. If the output dropped to its former level then it would be obvious that the increase has been due to the changes.

This was accordingly done. All previous changes were withdrawn (period XII) and the records were watched for the expected drop in output. It did not happen. Daily and weekly totals hit a new high level, while a very small recession in the hourly rate was not considered to be of any importance. It could confidently be asserted that output in this segregated group had increased and was increasing quite independently of hours and rest pauses. The factor associated with the increase had eluded the recording methods once again.

OTHER TEST GROUPS

There was, however, one change which might have accounted for the improvement in output—that of the alteration in the method of calculating the piece-work payments. As has been pointed out above, this was a mere administrative convenience, by which the six operators were dealt with as a separate unit for calculation instead of being included in the figures for the department as a whole. It might, however, have had an effect and this effect could be investigated by setting up—

(*a*) another group which was not physically separated from the main department but which was dealt with as a distinct unit for piece-work purposes; and

(*b*) a group which was physically separate but which was not treated as a distinct unit for piece-work calculations.

To provide data on the first set of conditions the Second Relay Group was set up in which a small number of operatives were taken as a separate unit for piece-work purposes though they still remained within the main department. During the nine weeks they were kept under observation output rose some 12½ per cent, but the other operatives objected to the arrangement and the group had to be disbanded.

The second of these sets of conditions was tested out in the Mica Splitting Test Room where five girls on a fairly skilled job were isolated in a separate room though they were not dealt with as a group for piece-work purposes. The result was a moderate but steady rise in the rate of output for the first few months. Here again, therefore, was an increase in production rates which seemed unrelated to changes in conditions. Whatever kind of test group was set up produced a rise in output no matter whether the light was increased or lowered, the hours and rest pauses were lengthened or shortened, the basis of piece-work calculations was group or individual. Was there any common factor which could account for the increase? All that was apparent was some undefinable "improvement in morale," but the attempts to reduce this to manageable terms were only partially successful.

What had happened, of course, was that manageable primary groups had been set up in which it was possible for good quality face-to-face relationships to be built up. In the Relay Assembly Test Room, for example, a group of six had been segregated. Two of the members did not fit in with the remainder and were replaced by others who formed better relationships. The supervision was taken over by the investigator who was responsible for designing and carrying out the experiment, someone who was interested in the girls as individuals, who discussed the changes with them and who encouraged the building up of a steadily improving relationship throughout this primary working group. The literature contains many references to girls going out together in their spare time, bringing cakes for birthday parties, and the like. It was quite obvious that a pattern of good quality relationships grew up over the period of the experiment, suited to the task in hand, permeating the immediate social environment of the operators, in which all the parties concerned played the roles demanded of them successfully and with satisfaction to themselves.

Few things could demonstrate the importance of the primary working group and the relationships within it better than the Relay Assembly Test Room. The same point is emphasized also in the other test groups which were set up for one purpose or another. The "experiments," while they mostly failed in their main purpose of showing what factor in the situation was associated with increased output, did provide the conditions where a primary group could exist and develop a workable and satisfactory pattern of relationships. Every time this happened, particularly in the later groups where some trouble was taken to place congenial individuals together, satisfaction increased and output went up.

THE BANK WIRING OBSERVATION ROOM

Deviating from the strict chronology of the Hawthorne Investigations, to which we shall return in due course, let us turn to the attempt that was made to find out what actually happened in a normal working group. This was in the Bank Wiring Observation Room in which fourteen operators working on the connexions of rather complicated switchboard equipment were placed in a separate room. The internal organization of this group appears officially to have been as follows—

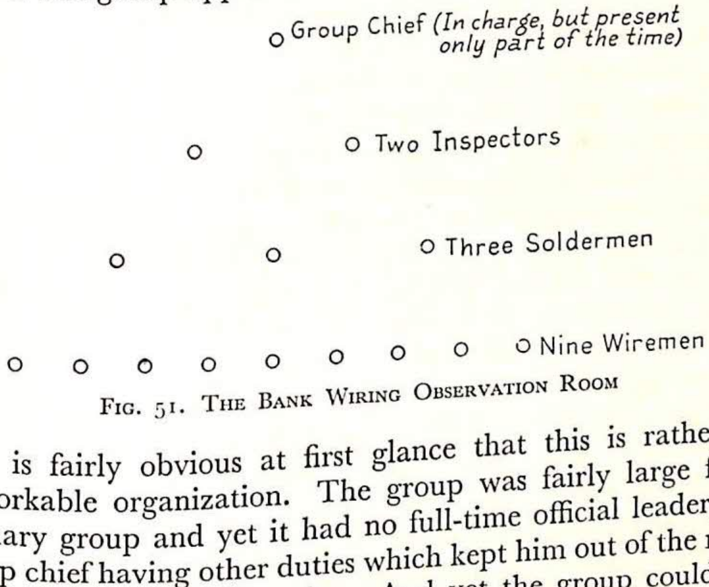

Group Chief *(In charge, but present only part of the time)*
Two Inspectors
Three Soldermen
Nine Wiremen

FIG. 51. THE BANK WIRING OBSERVATION ROOM

It is fairly obvious at first glance that this is rather an unworkable organization. The group was fairly large for a primary group and yet it had no full-time official leader, the group chief having other duties which kept him out of the room at least half the working day. And yet the group could not fall into two or three stable sub-groups because wiremen, soldermen and inspectors appear to have changed around from job to job while the last-named, though they were responsible for the quality of the work, appear to have had no responsibility either for administration or for human relations within the group. Moreover, the inspectors reported to their own functional chief. As one might have expected, the personal relationships within the official pattern were of low quality and the pattern itself was very poorly defined because the individuals did not carry out the roles required of them.

It is interesting to see what the actual situation in the group was in terms of—

(*a*) the organization of work;
(*b*) the pattern of significant relationships; and
(*c*) the relation of it to the official organization.

In the first place, the actual organization of work bore only the vaguest and most distorted resemblance to what it was officially supposed to be. There was organized limitation of output, most individuals turning out significantly less than they could have done, either by wasting time deliberately or by stopping before the appointed hour—it appeared, incidentally, that the most efficient workers wasted most time in order to keep their output down to the group standard. The departmental records were largely meaningless, the men reporting figures of output which bore no relation to the amount they had actually done. Claims for time-rate, which was paid when a stoppage occurred beyond the worker's control, were invented for no reason or lengthened when they actually occurred. The quality of output as checked by the inspectors varied for no apparent reason, some men being charged with more rejects by one inspector and less by another. In respect, therefore, of output, records, and quality, the "official" appearance of the department was little more than a fiction, the facts in each case being entirely different.

Secondly, the pattern of significant face-to-face relationships hung mainly on the group's unexpressed but very real intention to protect itself against change by keeping output at a standard level. Anyone who showed a tendency to produce more than the unofficial standard was subjected to social pressure until he fell into line. The leadership roles in this self-protective process were held by unofficial members of the group and a whole hierarchy of positions in this unauthorized pattern of relationships was found to exist. It is important to emphasize that these unofficial roles and relationships were the ones that mattered. They formed the immediate social environment of each individual, they were effectively enforced, and they were aimed at maintaining a state of affairs which was to a great extent opposed to the official aim of management.

The third and perhaps the most interesting point is the relation between the "official" purpose and organization of the group, i.e. its production and remuneration in terms which the management of the company would recognize, and its unofficial but more significant and effective organization. Obviously there was a conflict between the two, but for the section to continue in existence some working compromise had to be found. This compromise was found in the role of the immediate supervisor. He had little or no place in the unofficial pattern of relationships within the group, certainly not a leadership role. He was aware of much that went on which was contrary to the established procedures but made no attempt to interfere and at times explained away shortcomings to his own superiors. So long as the standard day's work was forthcoming, even though this standard was lower than it need be, he appeared satisfied, and closed his eyes to other things. He thus personified a compromise whereby certain of the aims of management were satisfied and certain of the group's own unofficial purposes were carried out. Neither side got as much as it wanted for the two aims were not reconciled.

THE INTERVIEW PROGRAMME

Along with the various test rooms which have been described, one attempt was made to find out more directly how a large number of workers thought and felt. This was the interview programme, which was initiated as soon as the Relay Assembly Test Room had made it clear that hours, rest pauses, lighting, and the like were much less important than the more intangible things like attitudes and relationships. It had not escaped notice that the different quality of supervision in the Test Room had made an important difference, and it was decided that an attempt should be made to find out something about workers' attitudes to the company and the people in charge of them, in the hope that the material thus obtained would be useful in training supervisors.

With this in mind a number of workers were interviewed by staff appointed and trained for the task. In the early stages they sought to find out what employees thought about certain topics, but as the programme developed the interview method became more informal and employees were encouraged to talk about whatever they thought important, while the interviewer listened sympathetically and took notes. Between 1928 and 1930 over 20,000 employees were interviewed for periods lasting from thirty minutes to an hour and a half.

The results were certainly effective in providing material for supervisor training. Added to the Test Room findings it quickly became apparent that the former conception of the supervisor's role as someone who told others what to do, and told them off if they didn't do it, was entirely inadequate. By listening sympathetically the interviewers were able quickly to build up a relationship with employees which inspired confidence and elicited co-operation to something like the degree that had been seen in the Test Room, and which it was now believed had contributed so much to the changed atmosphere there. All this pointed forward to a new role for the supervisor and though the full implications were not realized at the time, certain changes in the methods of supervisor training were made.

In other ways also, the results were illuminating. It soon became obvious that comments were in many cases unrelated to facts. In certain cases the employment conditions were adversely criticized when it could be demonstrated quite objectively that they were well above the average for the district. In other cases it was shown that the things employees considered important were not those which made the greatest material difference to them. The quality of supervision, for example, seemed to matter to most people quite as much as wages. Furthermore, it was apparent that many comments were coloured by matters outside the factory or by the employee's own state of health. The irrational element in employee attitudes forced itself more and more on the attention of the research workers until eventually it was recognized that what a worker felt about a particular topic was just as important as the facts about that topic, and that even though his view might be completely unjustified and mistaken it had to be taken seriously if a true appreciation of the human situation at work was to be gained.

The interview programme made it finally clear that the intangibles were more important than the actual conditions of work. Even though Western Electric were among the most enlightened employers in America—they would not have carried out such a programme if they had not been—it is fair to say that the interviewers uncovered a dismaying amount of dissatisfaction and frustration, much of it stored up for a long time and all of it capable of dissipation as soon as the employee had a chance of establishing good quality relationships with someone on the company's higher staff. It was perhaps unfortunate that that person had to be an interviewer with pencil and notebook who had been trained to draw him out and whose contact with him was shorter in term and more artificial in nature than that of his immediate supervisor. But this was due to a number of causes, most of which grew out of the mistaken idea that the economic relationships and the physical conditions at work were more important than the individual's attitudes and the immediate social relationships in the primary group wherein he passed his working hours.

THE SIGNIFICANCE OF HAWTHORNE

The first series of investigations at Hawthorne petered out when the depression of the 1930's hit American industry. Two projects appear still to have been running—the Relay Assembly Test Room and the Mica Splitting Room. In both, the operators were aware of the looming danger of unemployment which indeed formed the background to the thoughts of most workers in those days. One might have thought that in these conditions the rational self-interest of workers would have encouraged them to work as hard as possible in the hope of being kept on or at least of making as much in piece-work as was possible while the job lasted.

Nothing of the sort happened. Output rates dwindled and earnings fell with them probably because the general attitude was that in the face of such an overriding anxiety individual effort was unavailing. In spite of the high team-spirit which had been built up in these primary groups the blow to their morale was too severe and their sense of purpose fell away with the rest of the economy. How far such a reaction spread and multiplied itself during those years must remain a matter for speculation.

No other series of investigations can compare with those carried out at Hawthorne in scope and depth. To them and to the writings of the late Professor Elton Mayo we owe much of our present understanding of the social psychology of work. This is not to say that the lessons of the Hawthorne studies were properly appreciated at the time, and indeed it is doubtful whether we have yet learnt all that we might do from the very full publications which have resulted from them.

Probably the first and most important lesson to be drawn is the supreme importance of the primary working group. It seems likely that the consistent improvements in production which were seen in almost all of the test groups were due to the opportunities thus provided for better integrations to take place within these groups. It is also probable that the astonishing improvements in production and morale which were seen in the Relay Assembly Test Room were due to the fact that, with the replacement of the two girls who didn't fit and the higher grade of supervision, a primary group in which the relationships were of very high quality and in which each member accepted his or her role wholeheartedly was set up.

The second lesson is probably that in the remainder of the company the relationships within the primary groups were unbelievably poor. The Bank Wiring Observation Room was quite probably typical of most departments in that the significant unofficial organization and purpose of the group bore no relationship whatsoever to the official organization and purpose.

The third lesson derives from this but was brought to light in the interview programme which showed that even in this socially responsible company the attitudes of many individuals showed little evidence of satisfaction in their work or identification with the organization. Lacking satisfactory relationships or any sense of common achievement in the course of their day-to-day work these individuals were apparently left in an emotional void during this significant aspect of their lives.

Finally it is obvious that the point to which attention should be directed is the supervisor of the primary working group. Given the right personal qualities and an adequate training in social skill, he can do something towards improving the situation within the primary group, always provided that he is given workers capable of adjustment to the situation. He can also do something towards keeping the group in touch with the rest of the organization provided he takes his proper place in the general network of communications.

SUMMARY

1. How did the Hawthorne Investigations start?

In 1924 a series of studies on the effect of better lighting on output in the Western Electric Company's works near Chicago showed that production rates tended to rise as lighting was increased. These conclusions, however, were vitiated when it was seen that any apparent change in the lighting tended to result in higher output, even when the changes continued until lighting was reduced to very low levels. It became apparent that some factor other than lighting must be responsible for the improved output.

2. What was the significance of the Relay Assembly Test Room?

So that the situation could be further controlled and this missing factor brought to light, five girls on a repetitive job were put into a separate department specially arranged for observation. They were subjected to a number of changes in the arrangement of hours and rest pauses, each of which was accompanied by an increase in production rates. When these changes were withdrawn and the situation brought back to what it was originally, during a so-called "control period," production rates increased further still. The missing factor had eluded observation yet again.

3. What was the purpose of the Second Relay Assembly Test Group and the Mica Splitting Test Room?

In the first Relay Assembly Test Room the operators had been formed into a separate group for the purpose of calculating piece-work earnings. This was mainly a matter of administrative convenience, but to find out whether it had had any effect on the results two additional groups were set up. One, the Second Relay Assembly Test Group, was formed into a separate group for piece-work calculations but remained in the main department; the other, the Mica Splitting Test Room, remained as it was for piece-work calculation, but was placed in a separate room. In both cases improvements in production rates were noted, though the period over which observations were carried out was too short to be significant.

4. What was the purpose of the Bank Wiring Observation Room?

In order to gain a closer view of the actual situation within a working group an observer was introduced into this room to study the day-to-day relationships at work. He found that—

(*a*) the organization of work and the official records bore little or no relation to what actually went on;

(*b*) the significant relationships within the working group were quite unofficial; and

(*c*) there was a rather artificial compromise between what was supposed to happen and what actually happened, centring in the person of the supervisor.

5. What was the Interview Programme?

When the information from the various test rooms was studied it was decided that the company should try to find out more about what its employees thought and how they felt by interviewing a large number of them. It was thought also that the results would be useful in supervisor training. Over 20,000 interviews were carried out between 1928 and 1930 which disclosed that many of the employees, however irrationally, held very unfortunate attitudes to their work and the company.

6. What is the general significance of the Hawthorne experiments?

In the first place they drew attention to the importance of the primary group at work and the effect of the relationships within it on the individual worker and on production. Secondly, they suggested that the situation in a representative primary group was very unsatisfactory. Thirdly, they showed that many individuals were deriving little or no emotional satisfaction from their work or the relationships it involved. And finally they underlined the importance of the immediate supervisor both in his effect on the relationships within the group and on the communications between that group and the rest of the organization.

CHAPTER XXV

THE PSYCHOLOGICAL BASIS OF MORALE

IF all the individuals who work in an industrial company are well adjusted to their jobs and to each other the morale of that company will be satisfactory. If a significant number are too intelligent for their jobs, if they find them uninteresting and unsatisfying, if they cannot fulfil the role required of them, and if the rewards do not come up to their levels of expectation, then the morale of that company will be low. In the last resort, therefore, morale is a matter of individual adjustment to the work-situation.

Of course, if large numbers of workers in a concern are ill-adjusted or dissatisfied then there will be a cumulative effect and the individual's part in the situation will tend to be lost sight of. It may well be also that the removal of some causes of dissatisfaction which affect many individuals at the same time will cause a significant rise in the morale of a whole company. Similarly, if the adjustment of one important member of the company is bad this will have an effect on a considerable number of others. When the managing director feels misunderstood and ill-used the rest of the staff are likely to suffer also. These far-reaching considerations, however, should not blind us to the fact that morale in the long run is made up of the feelings of a large number of individuals.

INDIVIDUAL ADJUSTMENT TO THE DEMANDS OF A JOB

We have already considered the individual's adjustment to the work-situation when we were dealing with selection, and, as in so many other cases where human beings are concerned, we found that a number of different elements entered into the picture. These were grouped into categories and we might use a similar scheme in this present connexion. An individual must be well adjusted to his job from all points of view, because if he falls below certain levels in any one this may affect all the others.

Take, for example, the question of physical make-up. The job will make certain demands on the individual, such as that he must put forth a certain amount of physical effort under certain conditions of temperature and ventilation. If these demands are low, as they would be in a sedentary job in an air-conditioned office, then no one could fail to adjust to them unless he was seriously ill or disabled. But if these demands are high, as they would be in the stokehold of a coal-burning ship, then a large number of people would be quite unable to stand them. Only if the individual is able to deal with the demands of the job under this heading will he succeed in making any adjustment.

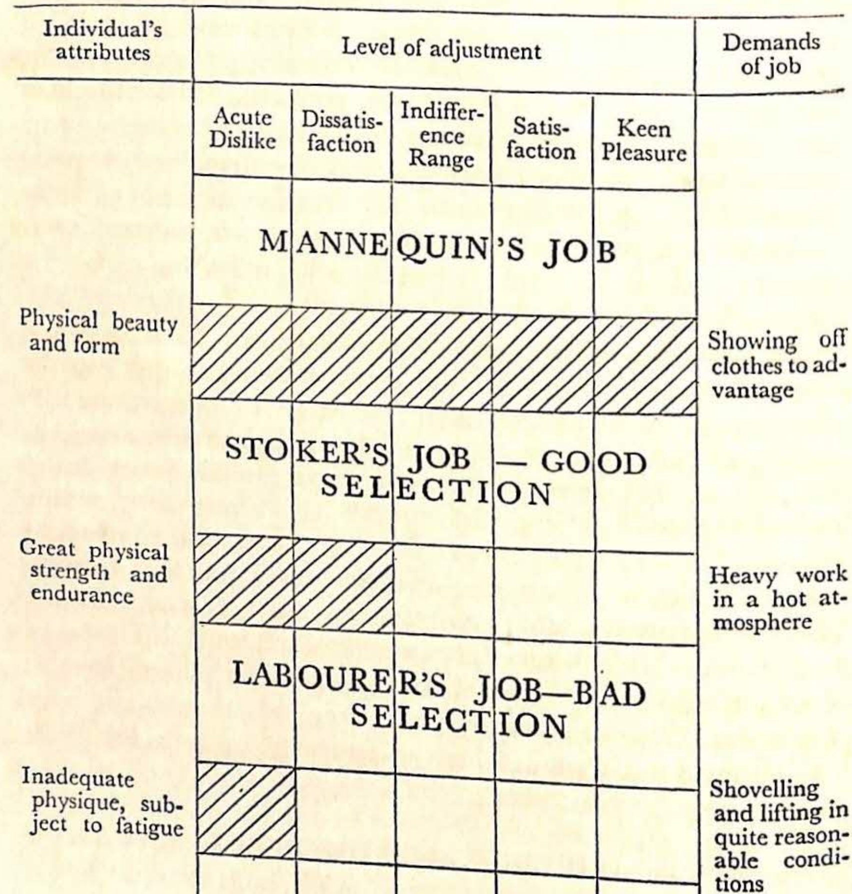

Individual's attributes
Level of adjustment
Demands of job
Acute Dislike
Dissatis-faction
Indiffer-ence Range
Satis-faction
Keen Pleasure
MANNEQUIN'S JOB
Physical beauty and form
Showing off clothes to advantage
STOKER'S JOB — GOOD SELECTION
Great physical strength and endurance
Heavy work in a hot atmosphere
LABOURER'S JOB—BAD SELECTION
Inadequate physique, subject to fatigue
Shovelling and lifting in quite reasonable conditions

FIG. 52. RELATION OF AN INDIVIDUAL'S PHYSICAL MAKE-UP TO THE DEMANDS OF THE JOB

Failure to adjust will result in dissatisfaction or acute dislike of the job from this aspect. But it is always possible that a successful adjustment may result in satisfaction or even pleasure being derived from the work-situation. Think, for example, of a mannequin's job, which demands under the heading of Physical Make-up, symmetry of form and grace of movement. The young woman who measures up to this specification may find it extremely agreeable to be admired and envied by those to whom she displays herself and from this point of view her adjustment may rise far above mere indifference level. We might therefore consider adjustment on a five-point scale, with active dislike at one extreme and keen pleasure in the other, and lay out the level for different jobs in diagrammatic form, as shown in Fig. 52.

The reader can imagine many variations. In some cases adjustment may be so good that it will outweigh other aspects where some dissatisfaction might be felt. In other cases the conditions may be so trying that even with the best selection one may never hope to get the adjustment any higher than the low end of the indifference range. Such cases should not be frequent but when they do occur it will be necessary to offset this aspect by much better adjustment under another heading. There might also be other complications, such as where adjustment on the health and fitness aspect of Physical Make-up is adequate, but is not under the First Impression. Some overall assessment, however, should in most cases be possible, and indeed must be found if the situation is to remain at all manageable.

THE INDIVIDUAL'S ASPIRATIONS AND THE SATISFACTIONS OF THE JOB

Levels of adjustment under the headings of Qualifications, Brains and Abilities are probably fairly obvious, from what was said in the chapter on interviewing. It may be useful, however, to spend a moment on the remaining three points.

The question of motivation probably plays a very important part in individual morale, for here it should often be possible to raise the levels of adjustment above the indifference range. Satisfaction in work, comprehension of, and identification of oneself with, the purpose of work, are essential elements in morale; in fact it may well be that low morale is caused more often than not by a failure of the work-situation to satisfy the motivational side of the personality.

Recapitulating what we said on this subject in Chapter XV we must consider three aspects or levels. First there is the question of earning enough to provide for one's material needs: the actual amount required will vary with the individual, but he should always be able to see his way to earn what he wants and also to see a reasonable relation between his contribution and its reward. If he feels that increases in wages are given on irrational grounds, or are withheld because someone doesn't like his face, the individual's morale will be put to a severe test. But if he can see that his work is producing an increased result in which he will share, such as when a salesman's commission rises with increased turnover, he will see a reasonable and constructive connexion between his efforts, the results which accrue to the company he works for, and his own material reward.

The lack of any obvious connexion of this sort has in the past contributed to a serious lowering of morale. When a worker remains on a fixed wage but is exhorted continuously to work harder and more efficiently he is likely to reason like this—"I produce fifty units a day just now. Formerly I produced thirty-five for the same wage, and now they want me to produce seventy. If I'm turning out twice as much in the same time as I used to without getting any more for it, then somebody must be benefiting from my extra work and I'm being had for a mug." Even making allowances for the possible costs of increased capital equipment and lower prices to the consumer, there is just enough sense in this to make a man or a group of men feel disgruntled.

MATERIAL REWARDS

To avoid this lowering of morale, there ought always to be some reasonable answer to the question of who benefits by harder or more efficient work. Piece-work rates, commissions and bonus incentives provide such an answer, and it may be that the direct and obvious connexion which they show between effort and reward makes them contribute effectively to the individual's satisfaction in his job. They do, however, have the possible drawback of leading to over-emphasis on the individual's material rewards, and where they have been introduced with more enthusiasm than discretion they have at times had the unfortunate result that no one will do anything at all unless he sees how it will directly benefit him at the end of the week. Now there are many things that cannot easily be made the subject of direct financial reward, such as intelligent, co-operative working, amenability to discipline, and the extra care in the finish and appearance of an article. When people at work disregard everything that cannot be paid for directly by the piece, matters like these will go by the board.

There is another approach which should be more satisfactory, though it takes a great deal more "putting across." The basic industrial or commercial process is to buy something in a form which is of limited use to other people and to make it more useful either by changing its form (by manufacturing) or by having it ready when and where people want it (as in the distributive trades). This added usefulness or value will be paid for by the user so that a margin over the original cost of the material is provided, out of which all those who have supplied labour, equipment, or enterprise, can be rewarded. This sharing of the margin has in the past led to considerable dissatisfaction.

Traditionally, equipment and labour could be bought at market prices which fluctuated with supply and demand, but which, once they had been paid, left no additional obligation on the part of the buyer. This "commodity theory" of labour left it with no claim to any share in a larger margin, which belonged unequivocally to the owners of the enterprise. More efficient working, therefore, benefited no one except the owners unless someone else could by some means or other wrest a part of the increased margin from them. The trade unions were, in essence, a means of doing this by increasing the workers' bargaining power and thereby forcing up the price of labour. Some people have held that so long as the commodity theory of labour is accepted, the chance of self-respecting relationships within an industrial company will remain low because of the fear that only by fighting for it can the workers share in the results of more efficient working.

A method of allocating a fixed proportion of the "value created" or the difference between the cost of materials, power, etc., and the selling price, has been tried out with some success in certain firms. It is described in detail by Mr. Hubert Somervell in his book *Industrial Peace in our Time* and provides a means of enabling the individuals who work in a firm to see a direct connexion between the results of the working of a firm *as a whole* and their own remuneration. Profit-sharing or co-partnership schemes have been tried in a number of companies since the 1914–18 war usually with only limited success, and it must be accepted that a considerable effort will usually be involved to explain the principles to those concerned. The scheme referred to above, however, is logical and fair, and it should provide a means of dealing with this difficulty which in one way or another has bedevilled relationships since the industrial revolution began.

AWARENESS OF SOCIAL OBLIGATIONS

The second element in motivation, that of finding pleasure in the daily routine of work, need not detain us long. It is largely a matter of putting people into the kind of jobs they like, and with modern selection methods it should be possible to avoid falling below the indifference level in the vast majority of cases. The avoidance of dissatisfaction with the working environment can also be dealt with fairly straightforwardly by paying attention to the issues dealt with in Chapters XVI and XVII.

It is in the third aspect of motivation, that of the sense of social obligation, that most remains to be done. Nothing can contribute more towards morale than the sense that one is doing something useful to others, and individuals or groups who are conscious of the peculiar value of their work can frequently withstand other things which would normally cause severe discouragement. Rescue squads, doctors, nurses, welfare workers, and similar individuals can usually put up with adverse conditions because they know that human life and happiness depends upon their work. On a lower plane, some sense of purpose is necessary also to any feeling of satisfaction in work. One of the most tragic aspects of long term unemployment was the loss of this sense of purpose, which also vitiated many of the attempts to develop activities for the unemployed. There was too little feeling of usefulness in making rugs or laying out a tennis court to engage the attention of a craftsman who couldn't get a job in his own trade.

Modern industry, however, has in many cases made the social purpose of many jobs difficult to understand. If the village clogmaker in Lancashire wanted to know the meaning of his job he had only to listen to the clatter of his wares on the road as people walked past his window wearing them. But the modern factory worker who spends all day fitting unrecognizable pieces of metal into a component whose use he does not understand may have no idea whether he is making anything which other people can wear or use. Without that knowledge his job is perilously near to becoming a stultifying and meaningless routine.

This sense of purpose in work which has been pushed out by large-scale production methods may have to be put in again by a deliberate effort. Enough experience was gained during the war to demonstrate that any attempt to show how an individual's job fitted into the gun or tank or bomber had an effect on morale which far outweighed the trouble involved in staging the demonstration. It should not be impossible to make most production jobs meaningful by showing what the end-result of the process looks like and how it is used, while at the same time bringing out the place which the individual's job takes in the finished product. In fact, one might say that if a job has so little social usefulness that it cannot be demonstrated to the person doing it, one cannot expect this aspect in morale ever to rise above the indifference level.

Here again there will be differences between individuals, and the well qualified and able person may be dissatisfied with the social usefulness of a waiter's job, obvious enough though that may be. Given a reasonable degree of care in matching up, however, this should be a most important element in morale.

While we are considering the components of morale individually we must not forget that they are mutually interrelated. If an individual is put in a job the social usefulness of which is very obvious, but where he is paid less than others of his own background and qualifications he will not only be dissatisfied; he will also feel that his good nature and sense of duty are being traded upon, and only a very dedicated soul can put up with this without developing extremely unsatisfactory attitudes to his work and to the organization which employs him.

EMOTIONAL SATISFACTIONS IN WORKING RELATIONSHIPS

Under the heading of Disposition or Adjustment we considered the individual's emotional pattern in terms of the social role he could fulfil among other people, and throughout this section we have been considering the individual's place in the immediate working group and in the larger working unit. We have thought of the relationships with other people which his role involved him in and we have seen that these relationships form a most important part of his immediate working environment. It is not difficult to see, therefore, how large a part these relationships play in morale. Poor quality relationships within the working group and suspicious attitudes towards the company are synonymous with low morale. Once these have been in existence for a long time it is very difficult to know what can be done to improve matters.

But while the cumulative and mutually reinforcing effect must not be underestimated this is essentially a matter of individual adjustment. If anyone is placed in a role which his powers of emotional adjustment cannot stand up to, his morale will drop. Low morale is contagious, and if he is in a position where he can influence a number of other people it is highly likely that their morale will be adversely affected. Whenever a manager or supervisor, therefore, cannot cope with the nervous strain which his job imposes on him, there is a probability that the morale of those immediately under him will be low.

Very few of us are self-sufficient in this way. We depend for our self-confidence and reassurance on those around us and even though we are placed under no great strain our morale will drop if we are placed in trying relationships with other people. In a working group whose team-spirit is already poor, therefore, the morale of newcomers who are reasonably well adjusted will suffer. Where there is already a good team-spirit, however, even newcomers whose powers of adjustment are limited may be bolstered up to an adequate level. This, of course, raises a difficulty, because while groups of good morale are likely to attract well-adjusted people who need only limited support from others, poorly adjusted people who need a great deal of support from others tend to drift into the kinds of group where that support is least likely to be forthcoming. The man who cannot stand up to any responsibility and who drifts from job to job has little chance, as things are at present, of ending up among people who can give him the support and encouragement he needs so badly.

Much of this revolves round the supervisor, and it may well be that the lower the powers of adjustment of a working group the better the quality of supervision it must have if its morale is to be maintained. The inability to stand up to a social role is frequently associated with an insecure home background, while in later life people have managed better when by luck they found someone who could supply what the original father or mother had failed to provide. To a certain extent the primary working group in industry may take the place of the family and the supervisor may in certain cases take the place of a parent figure. If enough supervisors who were able to build up good relationships among a group and to take the leading role within them were available, then it might be possible to absorb more people with limited powers of adjustment.

In the ordinary course of events, however, this is not likely to happen. Supervisors who are aiming at improving their working groups will try to get rid of those who tend to lower the morale or who have difficulty in undertaking the role required. The ill-adjusted individual will be edged out and will drift into groups where the standards are not so high. As this process continues such individuals will tend to drift downwards until at last they end up in groups where the team-spirit is non-existent and the supervision is of a very unsatisfactory level. Only by a determined effort to absorb ill-adjusted people into the best group in which they can sustain a role can this process be avoided or reversed.

LEVELS OF PRESTIGE AND REMUNERATION

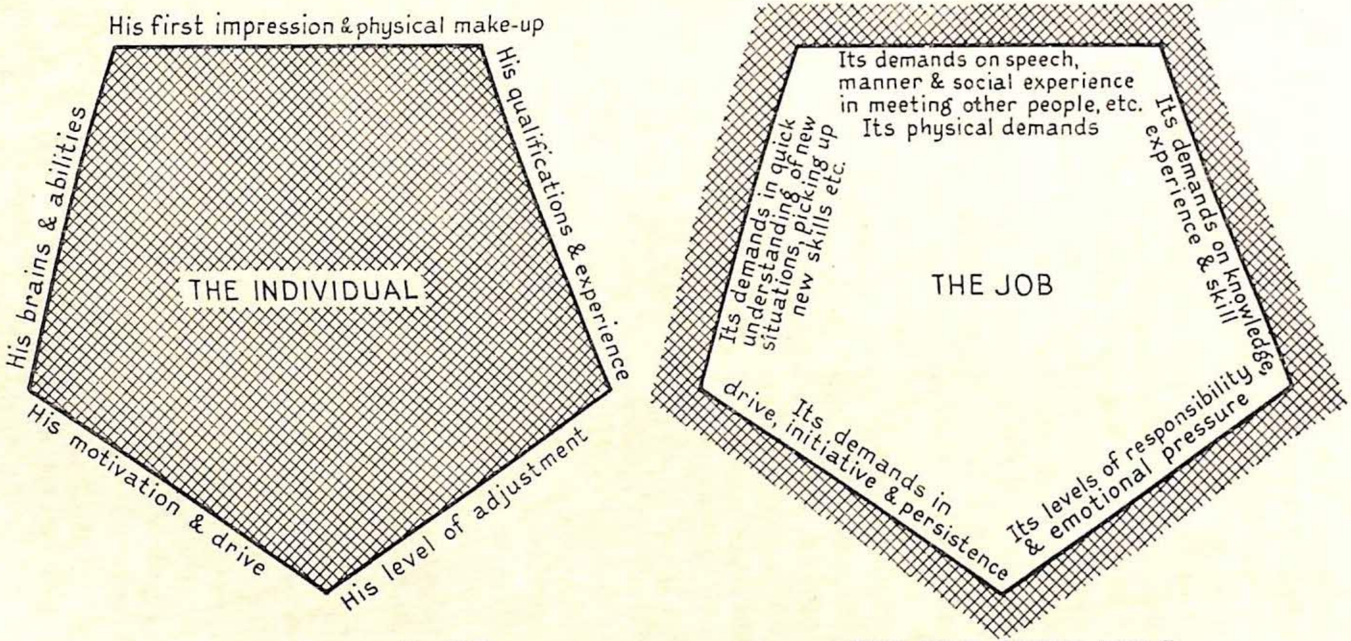
The general idea about putting an individual into a job which matches up with the level of prestige and of income which he expects to achieve should be clear enough. There are, however, difficulties when an individual's other qualities are not on the same standard as his expectations. Some unfortunate people are born into families where all the members and connexions are brilliant and successful, and where anything even moderately undistinguished is regarded as letting the family down. If these people have only an average level of ability they will be completely incapable of profiting by the opportunities with which they are confronted. It will be very difficult for anyone who has a university career open to him to find satisfaction in success as a bus-driver, even though this type of work is what he is best suited for.

At the present day there is a considerable likelihood that this type of maladjustment may increase. Opportunity is becoming more widely available, now that higher education is open to nearly everyone who has the brains to profit by it. Many people who would formerly have been prevented by lack of means from competing for higher-grade positions are now being presented with the opportunities for which their abilities fit them. But, conversely, many people of more modest ability, who formerly had these opportunities, are now being crowded out, and the finding of their level in a society where the freedom of movement has increased may well be a painful process.

Again, the levels of remuneration and prestige in this country are being subjected to sudden and violent change. Some years ago, for example, to be a house servant in a distinguished establishment was regarded as a highly desirable position, for which there was much competition. Nowadays, domestic service of any kind is regarded as less desirable than factory work by many people and there is a marked shortage of applicants. Similarly clerical and craftsmen's jobs were considered highly desirable by many people, while nowadays the semi-skilled production worker, from the financial point of view at any rate, is much better off.

Greater freedom of movement may place some people in charge of others who might formerly have resented the manners and speech to which they must now accustom themselves. This again may raise problems within working groups, and without a considerable effort of goodwill on all sides the relationships and the morale may suffer.

The following figures show in diagrammatic form how an individual may adjust to his job, with examples of above- and below-average adjustments.


His first impression & physical make-up
His qualifications & experience
His level of adjustment
His motivation & drive
His brains & abilities
THE INDIVIDUAL
Its demands on speech, manner & social experience in meeting other people, etc. Its physical demands
Its demands on knowledge, experience & skill
Its levels of responsibility & emotional pressure
Its demands in drive, initiative & persistence
Its demands in quick understanding of new situations, picking up new skills etc.
THE JOB

THE PENTAGONAL PEG THE FIVE-SIDED HOLE

Fig. 53. Individual and Job

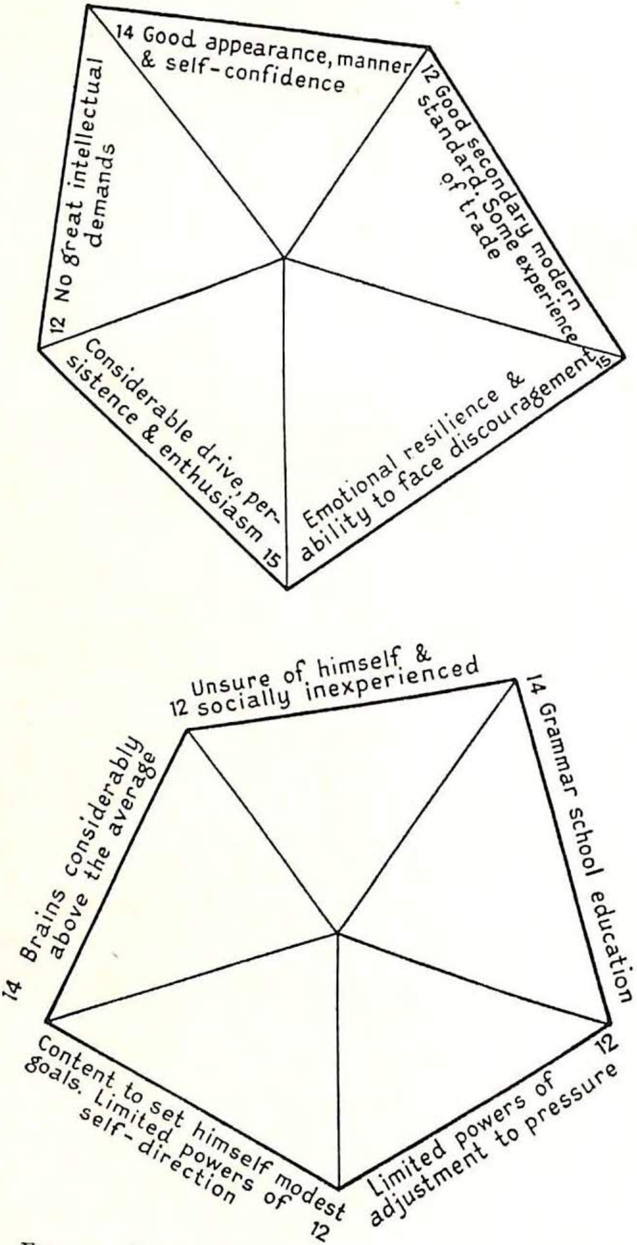

14 Good appearance, manner & self-confidence
12 Good secondary modern standard. Some experience of trade
15 Emotional resilience & ability to face discouragement
Considerable drive, persistence & enthusiasm 15
12 No great intellectual demands
12 Unsure of himself & socially inexperienced
14 Grammar school education
12 Limited powers of adjustment to pressure
Content to set himself modest goals. Limited powers of self-direction 12
14 Brains considerably above the average

FIG. 54. *Above:* SPECIFICATION FOR A SALESMAN'S JOB
Below: ASSESSMENT OF AN APPLICANT

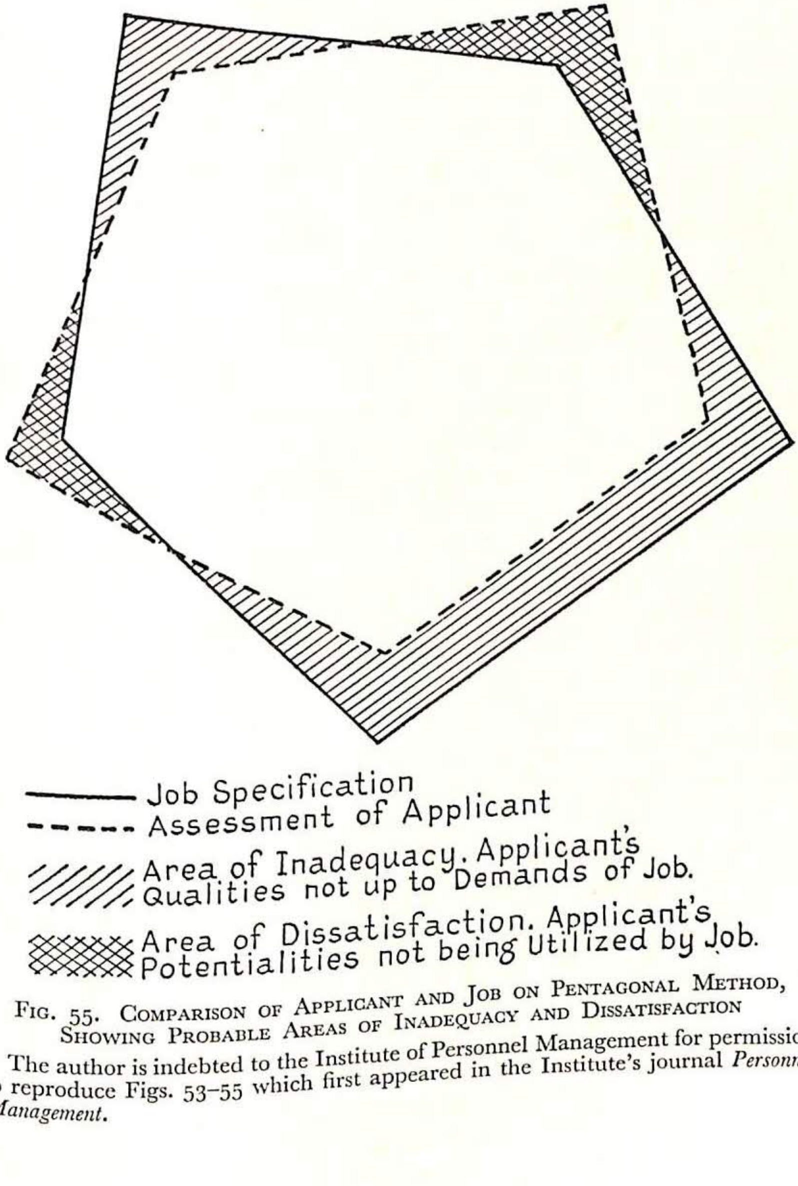

Job Specification
Assessment of Applicant
Area of Inadequacy. Applicant's Qualities not up to Demands of Job.
Area of Dissatisfaction. Applicant's Potentialities not being Utilized by Job.

Fig. 55. Comparison of Applicant and Job on Pentagonal Method, Showing Probable Areas of Inadequacy and Dissatisfaction

The author is indebted to the Institute of Personnel Management for permission to reproduce Figs. 53–55 which first appeared in the Institute's journal *Personnel Management*.

THE RELATION OF THE INDIVIDUAL TO THE COMPANY

Morale is in the last resort a matter of individual adjustment to the work-situation, and we have been considering this in terms of the five categories we used for matching up individuals and jobs. But in most cases an industrial job is carried out in a community, i.e. in an industrial company. The individual's adjustment, therefore, is not to the job alone, but rather to the job-carried-on-in-a-community. And while there are some communities which make it easier for the individual to adjust to his job, there are some which make it more difficult. These industrial communities, of course, are made up of individuals, but we must nevertheless consider the relation of the individual to the larger whole.

The purpose for which a community is formed plays a large part in determining the values and attitudes within it. A theatre audience, for example, can be swayed by common emotions while the play is in progress and all its members may be torn with sympathy for the heroine. When the curtain falls, however, this common bond snaps at once and the members file out as they came in, with no regrets for the loss of contact with one another. A family group, on the other hand, exists for mutual support and for the provision of a secure environment in which children can grow up. The standards of helpfulness and loyalty among the members, therefore, will be of a far higher order than we should expect in any other grouping. Military groups, religious groups, educational groups, and so on will each have their own distinctive character imposed upon them by the purposes for which they came into being. So long as these objects are explicit and obvious the pattern and quality of relationships within the group are likely to come more easily into being, and the common purpose is more likely to be achieved.

When we think of an economic group or a work-community it is necessary to consider the purpose for which it has been formed and how far this has been explicitly set forth. We have already seen something of the confusion which can arise over the monetary relationships within a company, and this can easily happen when the underlying conception is not made clear. These and other difficulties can only be avoided when the underlying conception and purpose of an industrial company is brought to light and submitted to rational examination.

THE PURPOSE OF AN INDUSTRIAL COMPANY

In the early days of the Industrial Revolution this underlying conception was fairly crude. The owner of the capital equipment bought raw material as cheaply as possible, employed workers at low wages, and produced goods which he sold for as high a price as they would fetch. In any of these transactions he was at liberty to drive as hard a bargain as he could, and in fact the prevailing attitude was that the harder bargain he drove and the higher profit he gained for himself, the better business man he was.

With this as the underlying conception of an industrial company, how far was it possible for the individual employee to achieve a satisfactory adjustment to his job? Being in the position of one of the commodities which was bought or hired as cheaply as possible, it is likely that he would be preoccupied with the thought that he was being exploited. This would certainly militate against his satisfactory adjustment to the job, and indeed it is likely that he would be mainly concerned with finding means to protect himself and strengthen his bargaining power. It was this role that the trade unions originally filled, and wherever such an underlying conception of industry is found, militant trade unionism is likely to be found alongside it.

Awkward questions may arise when we begin thus to examine the assumptions on which an industrial company is founded, and we may discover that some of these make the chance of an individual achieving a satisfactory adjustment to his work very slender indeed. If the purpose is exploitation either of the public by monopoly, or of the employee through a slack labour market, then the maintenance of good morale will be difficult or impossible. But if the purpose of an undertaking is one in which all the members can be associated on a self-respecting basis, then the chance of their achieving a satisfactory adjustment will be greatly improved.

If, for example, a company is formed to supply a public demand for goods, services, entertainment, etc., and if its employees, considering that purpose a worthy one, associate themselves with it, they may in large measure identify themselves with the company. Its expenses will be defrayed by the revenue which results from the sale of the goods or services, and provided that there are no inequities in the sharing of this revenue, then everyone associated with this work-community, whether as customer, investor, or employee, should get an equally fair deal. There are, of course, many complications in practice, but there is no reason why the underlying conception of the undertaking and its relationships with all those associated with it should prevent its employees from identifying themselves with its purpose. Such an identification may be the first step in making possible a satisfactory adjustment to their jobs.

Comprehension of a Company's Purpose

In many industrial companies today, particularly in those where a sense of social responsibility is prevalent, such a conception as the foregoing is probably accepted in the higher levels of management. But there may be a considerable difference between the general idea in the minds of the directors or owners of a business and what is presented to the worker on the factory floor. It will require a very good communication system within the company before each individual's task appears to him in its true proportion to the firm's overall purpose, and before his remuneration is recognized as his equitable share in the company's return for its services.

We have already considered the structure of an industrial company and we have seen how it is made up of a number of interlocking groups held together by a network of communications. We have also seen how easy it is for this communication system to stop short of full effectiveness and for an unofficial and at times antagonistic pattern of groupings to grow up when the official system becomes ineffective in practice. When this happens, the company suffers from a kind of "dissociation of its personality," two incompatible systems of ideas having come into existence at the same time. In any company where the underlying conception makes it difficult or impossible for the individual to achieve a satisfactory adjustment to his work this is bound to occur, the official organization with which the employee cannot identify himself being met by an unofficial protective organization and daily working being a matter of uneasy compromise between the two.

Evidence of this state of affairs may be drawn from Taylor's early experience and from the Hawthorne Investigations, and most people with some knowledge of industry can supplement these sources from their own experience. It is important to realize, however, that this same "dissociation of personality" can happen in companies where the underlying conception is ideal, so long as the communications network fails to make that conception explicit in the daily working of the organization. So long as gaps exist there will be certain groups which may continue without an adequate sense of sharing in the purpose of the company and of being identified with it, and within these groups the maintenance of morale will be difficult or impossible.

Perhaps at this point it is advisable to remind ourselves that the industrial company has a limited purpose, that of providing goods and services, in the same way as work occupies only a limited area in the individual's life pattern. We should not expect to find satisfaction for all our aspirations in the work-situation and if our job fails to put us in touch with great literature or to provide us with entertainment and romance, no great harm has been done. We can and should expect, however, that our job will enable us to earn a decent living by doing something useful, and if the socio-economic relationships and the prospects of advancement on the job are inadequate, then the individual's adjustment will be poor. It will not be improved, either, by schemes of higher education or classes in musical appreciation.

COMMUNICATION THROUGH MANAGEMENT AND SUPERVISION

The working out of the underlying conception of a company in practice and the making of it explicit in the individual's daily work is in the hands of management and supervisory staff. Provided that the underlying conception is adequate, low morale or dissociation of the company's personality will be due to their failure in this task. In the selection and training of these grades of staff, therefore, we have a problem which has not always been understood. Adequate attention has probably been paid in the past to the technical and administrative sides of their job, but it is doubtful whether they were always fully equipped to take their place in the company's structure of organization and to discharge the full responsibilities of their position.

It should not be a difficult task to develop in a suitable individual an awareness of what his job demands from this point of view. Put into words, he should think of his job in terms something like the following—"I occupy this particular place in the general set-up of the company. I understand and accept the general idea on which it is based, and I associate myself wholeheartedly with its purpose. I am a member of this group which is under the charge of so-and-so and I must do my best to fit into my proper place in it, co-operating intelligently with its leader and playing my part so as to maintain the pattern and quality of the relationships on which it depends. I am also in charge of this other group and I am responsible for the relationships within it, for these six people's understanding of its purpose and for their acceptance and discharge of their roles. I am also the link between them and the rest of the organization above me, in the same way as they are the links between me and the rest of the organization below. If I discharge my role properly the relationships within the group for which I am responsible will be of high quality, it will carry out its purpose effectively and its morale will be high. At the same time it will contribute to keeping up the morale and the effectiveness of any of the other groups with which its members come in contact."

We have already discussed the question of sophistication in social relationships, using the word to mean a conscious and objective approach to the role which a position demands. It will be obvious that such an approach is demanded of anyone who is appointed to the management or supervisory staff in industry. But to understand the role demanded by such a position is one thing and to carry it out effectively in practice is another. Social skill is also required so that in every situation the human issues and relationships may be handled in a way which maintains and enhances morale. Technical or administrative skill will not alone enable a manager fully to discharge his role. The calls on his social skill may be even greater.

Not everyone falls naturally into the leadership role among a group of others, even though he may be given the title of "manager" or "foreman." While a group will usually throw up a leader of its own, that leader may not be going in the direction which the official purpose of the organization demands. To avoid an uneasy compromise between official and unofficial purposes, therefore, we must select and train managers and supervisors whose personal qualities enable them to take the lead in most groups. We must train them to attain a degree of social skill which enables them to build up the best quality of relationships of which a group is capable, maintain a pattern suitable for the acceptance and discharge of the tasks in hand, and ensure that each member's role, including his own, is adequately carried out.

We must not, of course, expect too much, and we must realize that good relationships cannot be built up among individuals who are badly adjusted to their jobs. But when, in due course, we can provide a supervisor with suitable people and when we know that he himself is capable and well trained, then we shall be able to hold him responsible not only for his group's working efficiency, but also for its team-spirit and its attitude to its job.

CONCLUSION

Good morale does not happen by itself, nor can it be produced by good intentions alone. A great deal depends, as we have seen, on putting people into the right job, especially in the supervisory and management grades, and we have seen something of the means available for ensuring that this is done. Another element depends on providing adequate satisfactions for the motivational pattern, not only materially but also from the immediate surroundings and duties of the job and from the sense of purpose which is implicit in it. In some way connected with this is the third element—that which concerns the relationships within the immediate working groups of which an organization is built up. In the past we have not always felt capable of dealing with these latter elements, although the move towards better conditions and more imaginative training in industry had gone some way towards dealing with the second.

But while morale is in the last analysis a matter of individual adjustment, we must not neglect the community in which the job is done. Some companies form work-communities which facilitate the individual's adjustment to the work-situation, while others fail to do so because of incompatible attitudes and groupings within their organization. Each company is built up of individuals in various roles and relationships and its morale depends on their level of adjustment. But if that is satisfactory, particularly in the higher ranks, then it will form a well-integrated community which can place the newcomer in the job best suited to him and surround him with influences and relationships which foster the attitudes on which good adjustment and morale depend.

Building up such work-communities, however, demands a more sophisticated approach to the problems of group relationships and a higher level of social skill than has yet been accepted as necessary. We must lay it down as part of the supervisor's or manager's job that he must maintain and build up a good team-spirit among the immediate group of which he is in charge and that he must become an effective communication link between it and the rest of the organization, both upwards and downwards. When we find that a particular individual has little idea of the purpose of his job and has developed an unsatisfactory attitude towards it and the company, we must tax the supervisor or manager with the responsibility for putting this situation right.

There is an unfortunate legacy in British industry which at times makes the building up of good morale a difficult and long-term task. It can be done, however, so long as a wider understanding of the issues is spread, not among a few isolated individuals, but among the whole body of managers and supervisors. Once their social skill is adequate to the task we may look forward to a better state of things among people at work.

SUMMARY

1. What do we mean when we talk about "morale"?

Morale is essentially adjustment to the work-situation. Where large numbers of workers are concerned there will be a tendency for a common level of morale to be arrived at by a common sharing of attitudes. Likewise there are individuals whose position makes it possible to affect the adjustment of many other people for better or worse. Nevertheless, in the last resort, morale is a matter of individual adjustment.

2. How do we approach the individual's adjustment to his job?

Under the heading of selection we have already considered seven categories, each of which is an essential element in adjustment. We can think of the individual's level of adjustment varying on a five-point scale from, say, acute dislike to keen pleasure, with a range of indifference in the middle. When an individual's level of adjustment never drops below the range of indifference on any of these headings his morale is almost certain to be high. Examples are quoted under the heading of Physique.

3. How far does this include the individual's aspirations and their satisfaction or otherwise by his work?

We can think on the one side of an individual's desires and expectations and on the other of what the job has to offer in the way of satisfactions. If these are reasonably related one to the other the resulting adjustment may be above the level of indifference. If, however, the satisfactions are significantly below the level of expectation the individual's adjustment from this point of view will be poor. This applies both to material rewards and to the sense of purpose or social usefulness in the work.

4. How do we approach the emotional satisfactions in work?

Here again we are concerned with what the individual can stand up to and what the job demands. On the one hand individuals can stand up to different kinds of role among other people, and on the other hand jobs make different demands. If an individual is placed in a working group where the role demanded of him is about the highest he can cope with and where at the same time the working relationships are agreeable and reassuring, his adjustment from this point of view should be well above the indifference range.

5. Is morale solely a matter of individual adjustment?

Not entirely, because the individual's job will almost always be carried on in a work-community. The prevailing attitudes in this community may either help or hinder the individual's adjustment. Communities, of course, are made up of individuals, but the relation of the individual to the larger whole must be borne in mind.

6. What is the most frequent cause of a work-community hindering individual adjustment?

When the purpose and underlying conception of a work-community is such that the individual employee cannot associate himself with it on a self-respecting basis, then his adjustment to his job will be interfered with. In cases like this it is likely that an unofficial series of groupings will grow up, whose purpose is to protect the individual, in opposition to the company's official organization. When such a "dissociation of personality" occurs within a company its morale will be low.

7. Is it possible for a company whose purpose and underlying conception is adequate to suffer from low morale?

To be adequate in sustaining morale, the underlying conception and purpose of a company must be disseminated throughout every aspect of its daily working. This in turn depends on the normal communications network of management and supervisory staff. If that is faulty there may be groups where the purpose is not understood or shared and in which morale will be low.

8. What part do the management and supervisory staff play in the maintenance of morale?

Both as links in the network of communication and as leaders in the various groups of which a company is made up, supervisors and managers can determine whether the morale of a company is high or whether it suffers from "dissociation of personality." Sophistication in social relationships and a high social skill on their part are the most important elements in maintaining the company as an integrated community and in promoting suitable attitudes.

NOTES ON READING

SECTION I: The best textbook on general psychology is by Norman L. Munn and is entitled *Psychology: The Fundamentals of Human Adjustment* (Harrap). It is readable and well illustrated but it treats the subject fully and in detail so it is quite a long book and will call for a certain amount of study and concentration. A shorter treatment will be found in Rex and Margaret Knight's *Modern Introduction to Psychology*, published by the University Tutorial Press. A short book which deals simply with the basic concepts of psychiatry from the manager's point of view is Roger Tredgold's *Human Relations in Modern Industry* (Duckworth), while in Bernard Hart's *Psychology of Insanity* (Cambridge) is a very concise summary of the same subject.

SECTION II: The matching of individuals and jobs is covered by *A Handbook of Employment Interviewing* (Macdonald and Evans) by the present author. Ralph Barnes's *Motion and Time Study* (John Wiley), and H. M. Vernon's *Accidents and their Prevention* (Cambridge), are standard works on their respective subjects. General textbooks which will be found useful are C. A. Oakley's *Men at Work* (Hodder & Stoughton), and Norman M. Maier's *Psychology in Industry*.

SECTION III: An excellent short account of *The Hawthorne Investigations* is by Urwick and Brech in the "Makers of Scientific Management" series Vol. III (Pitman). More general texts are Raphael and Brown's *Managers, Men and Morale* (Macdonald and Evans) and Blum's *Industrial Psychology and its Social Foundations* (Harper). A valuable book on wage payment is Hubert Somervell's *Industrial Peace in Our Time* (Allen and Unwin).

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